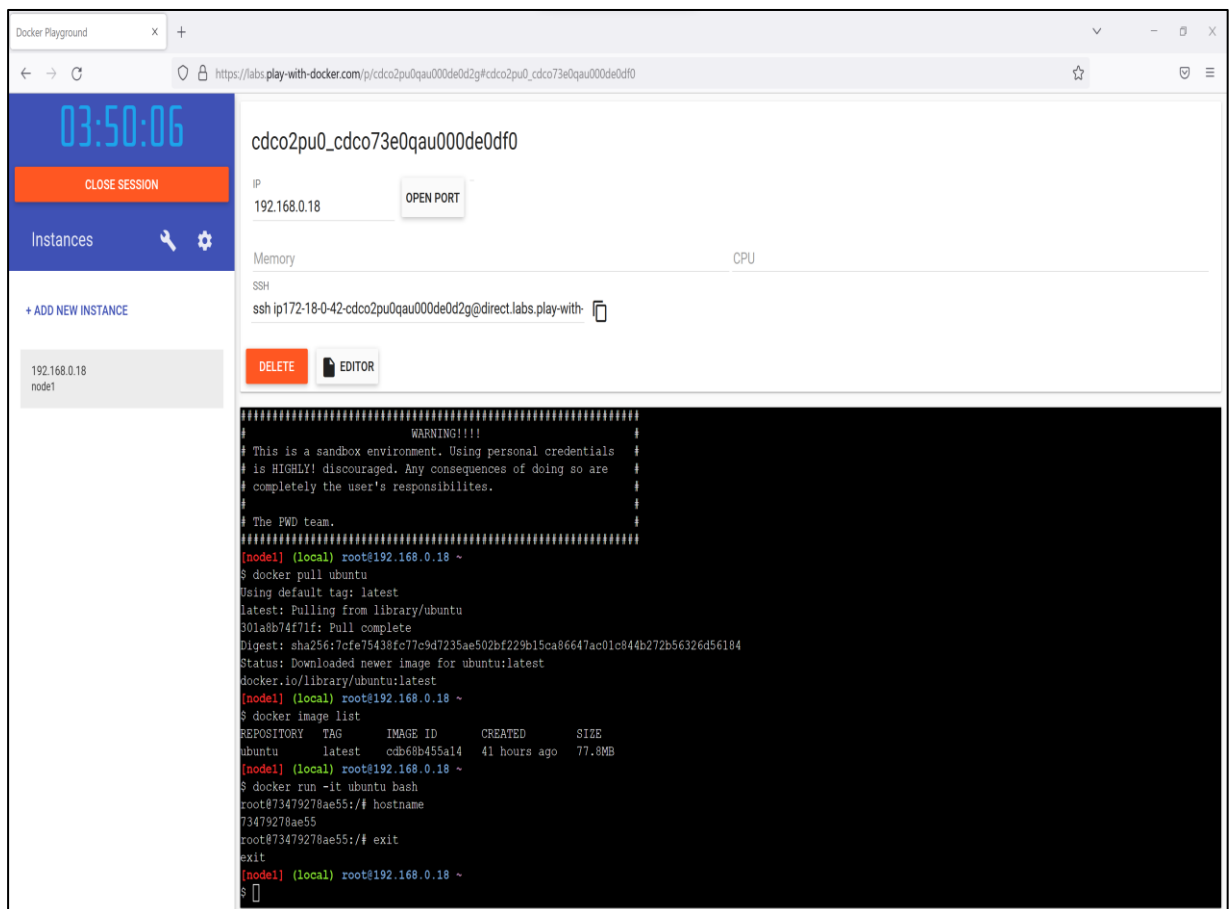


ASSIGNMENT – 4

EXPLORE KUBERNETES/ DOCKER

| | |
|---------------------|-----------------|
| Assignment Date | 27 October 2022 |
| Student Name | Jesima A |
| Student Roll Number | 2019103529 |
| Maximum Marks | 2 Marks |

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



The screenshot shows the Docker Playground web interface. On the left, there's a sidebar with a timer at 03:50:06, a 'CLOSE SESSION' button, and a list of instances including '192.168.0.18 node1'. The main area displays the instance details for 'cdco2pu0_cdco73e0qau000de0df0' with IP '192.168.0.18' and an 'OPEN PORT' button. Below this, there are tabs for 'Memory', 'CPU', and 'SSH'. The 'SSH' tab is active, showing a terminal session. The terminal output shows a warning message, followed by the command 'docker pull ubuntu', which successfully pulls the 'ubuntu:latest' image. Then, the command 'docker run -it ubuntu bash' is executed, and the user is prompted for a password to log in as root.

```
#####  
# WARNING!!!!  
# This is a sandbox environment. Using personal credentials  
# is HIGHLY! discouraged. Any consequences of doing so are  
# completely the user's responsibilities.  
#  
# The PWD team.  
#####  
[node1] (local) root@192.168.0.18 ~  
$ docker pull ubuntu  
Using default tag: latest  
latest: Pulling from library/ubuntu  
301a8b74f71f: Pull complete  
Digest: sha256:7cfe75438fc77c9d7235ae502bf229b15ca86647ac01c844b272b56326d56184  
Status: Downloaded newer image for ubuntu:latest  
docker.io/library/ubuntu:latest  
[node1] (local) root@192.168.0.18 ~  
$ docker image list  
REPOSITORY TAG IMAGE ID CREATED SIZE  
ubuntu latest cdb68b455a14 41 hours ago 77.8MB  
[node1] (local) root@192.168.0.18 ~  
$ docker run -it ubuntu bash  
root@73479278ae55:/# hostname  
73479278ae55  
root@73479278ae55:/# exit  
exit  
[node1] (local) root@192.168.0.18 ~  
$
```

2. Create a docker file for the jobportal application and deploy it in Docker desktop application.

Dockerfile

```
Dockerfile X
Dockerfile > ...
1 FROM python
2 WORKDIR /jobportalapp
3 COPY . .
4 RUN pip install -r requirements.txt
5 CMD ["python", "app.py"]
6 EXPOSE 3000
```

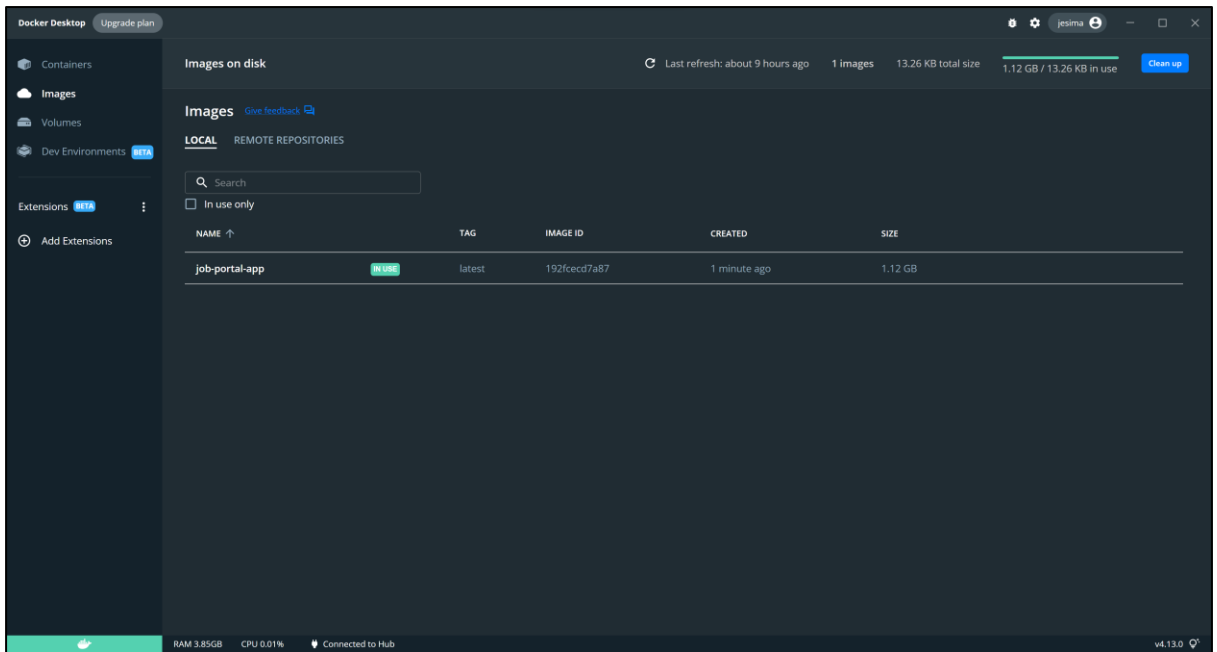
requirements.txt

```
requirements.txt X
requirements.txt
1 flask
2 ibm_db
```

Build Image

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL JUPYTER
PS C:\Users\Jesima A\Desktop\Assignment 4> docker build -t job-portal-app . --no-cache
[+] Building 47.6s (10/10) FINISHED
=> [internal] load build definition from Dockerfile 0.0s
=> => transferring dockerfile: 31B 0.0s
=> [internal] load .dockerignore 0.0s
=> => transferring context: 2B 0.0s
=> [internal] load metadata for docker.io/library/python:latest 2.5s
=> [auth] library/python:pull token for registry-1.docker.io 0.0s
=> [internal] load build context 0.0s
=> => transferring context: 3.60kB 0.0s
=> [1/4] FROM docker.io/library/python@sha256:fc809ada71c087cec7e2d2244bcb9fba137638978a669f2aaf6267db43e89fdf 0.0s
=> => resolve docker.io/library/python@sha256:fc809ada71c087cec7e2d2244bcb9fba137638978a669f2aaf6267db43e89fdf 0.0s
=> CACHED [2/4] WORKDIR /jobportalapp 0.0s
=> [3/4] COPY . . 0.1s
=> [4/4] RUN pip install -r requirements.txt 44.0s
=> => exporting layers 0.8s
=> => writing image sha256:192fced7a878e529f385f39d3d661011a88b7fb166104d27855740deea284ae 0.7s
=> => naming to docker.io/library/job-portal-app 0.0s

Use 'docker scan' to run Snyk tests against images to find vulnerabilities and learn how to fix them
PS C:\Users\Jesima A\Desktop\Assignment 4>
```



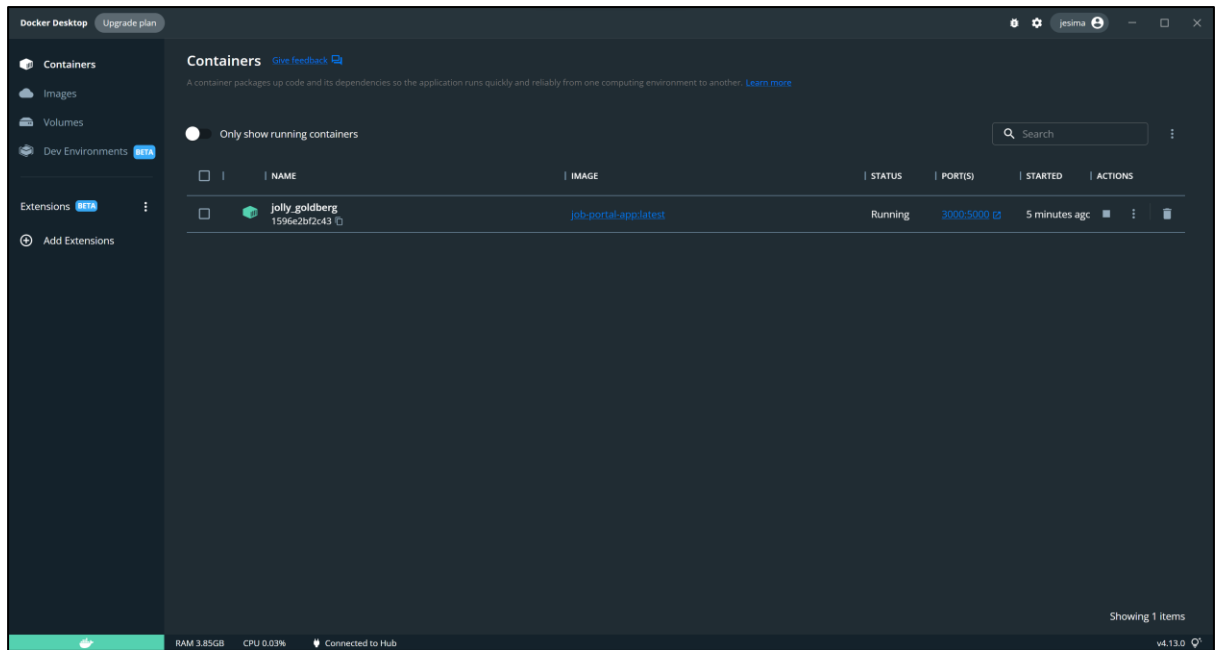
Run Image

```

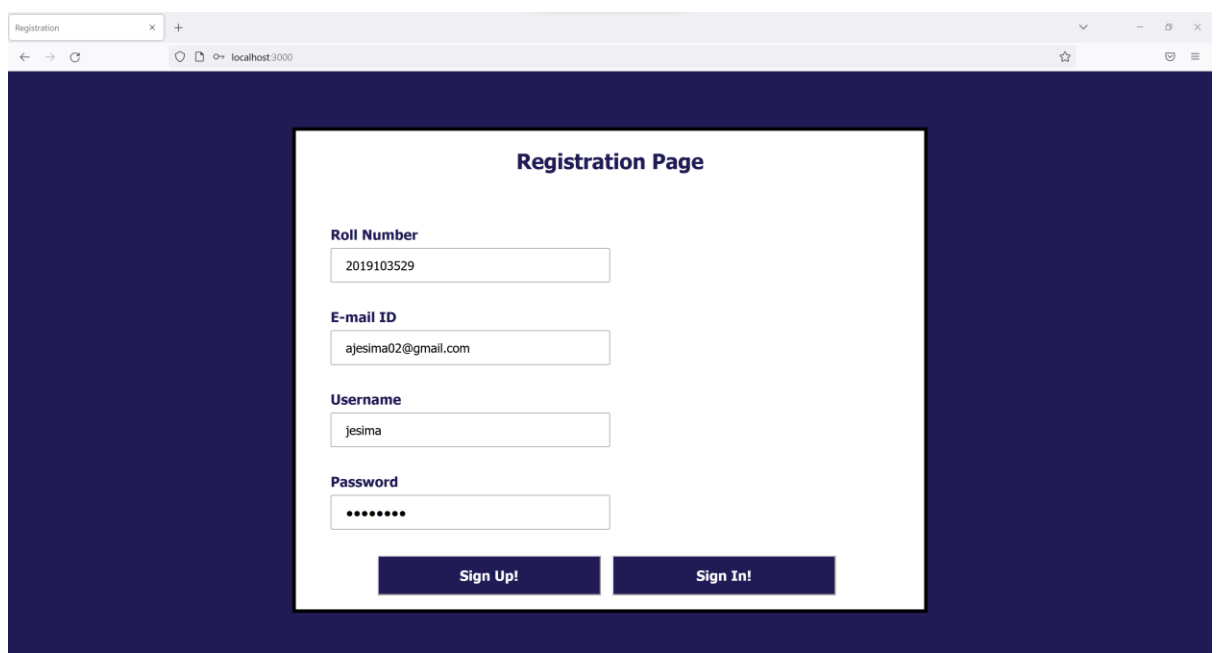
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  JUPYTER

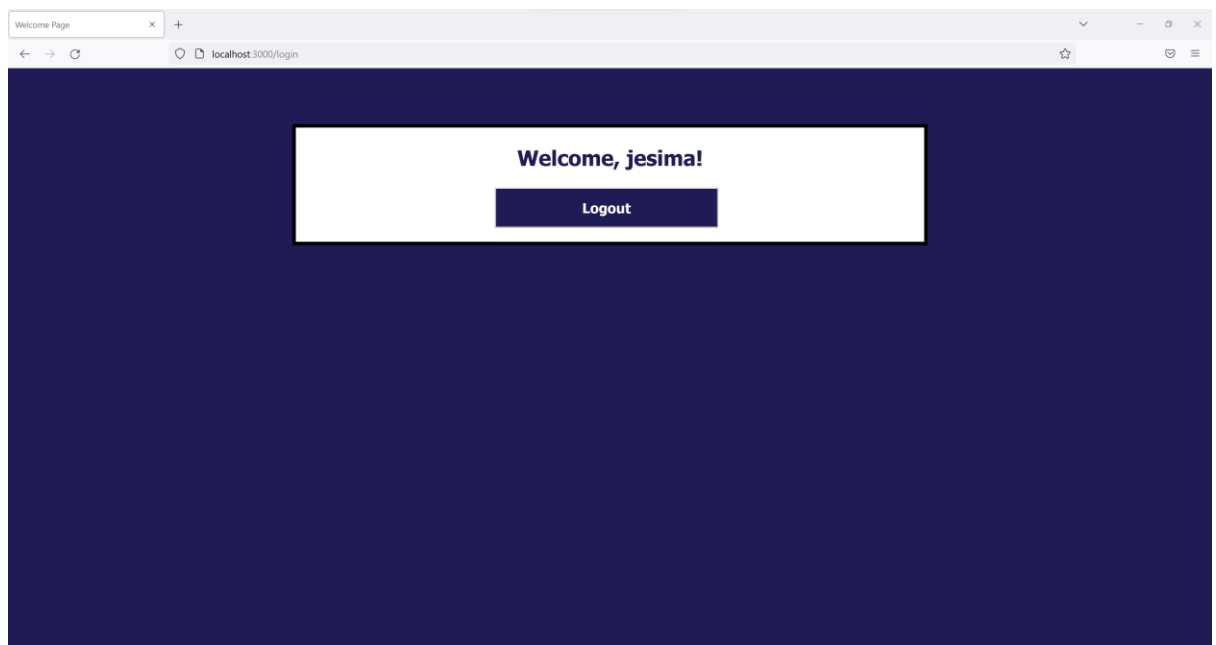
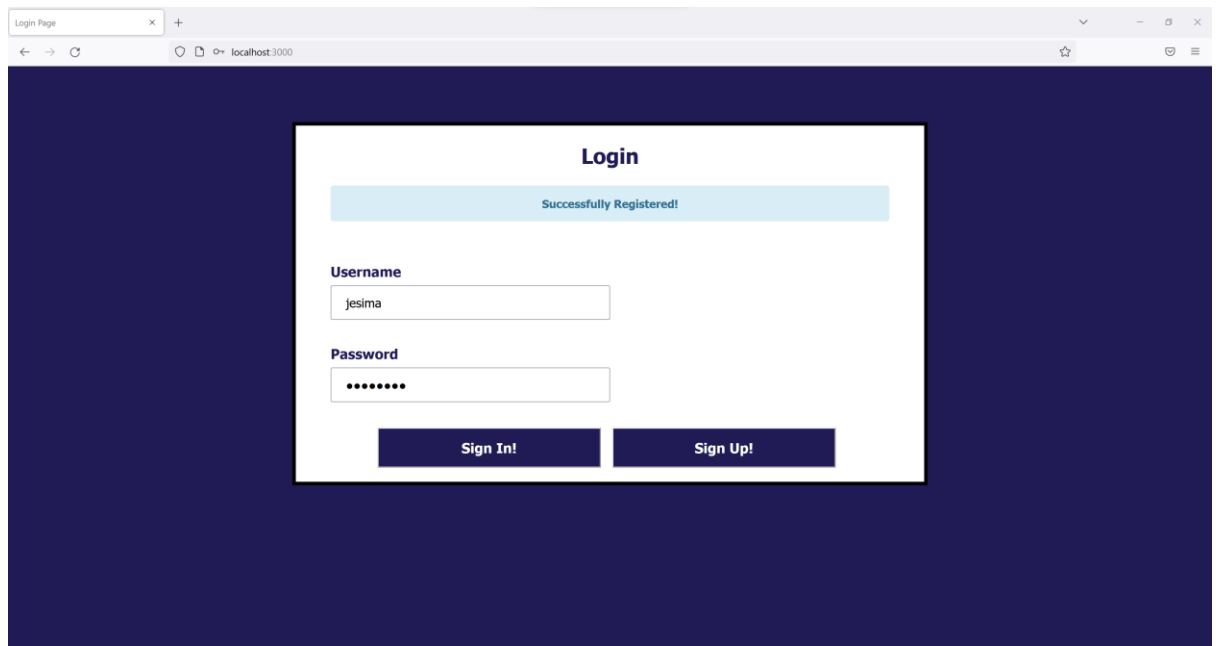
PS C:\Users\Jesima A\Desktop\Assignment 4> docker run -p 3000:5000 job-portal-app
* Serving Flask app 'app'
* Debug mode: off
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* Running on all addresses (0.0.0.0)
* Running on http://127.0.0.1:5000
* Running on http://172.17.0.2:5000
Press CTRL+C to quit
172.17.0.1 - - [26/Oct/2022 15:55:02] "GET / HTTP/1.1" 200 -
172.17.0.1 - - [26/Oct/2022 15:55:02] "GET /static/styles.css HTTP/1.1" 304 -
172.17.0.1 - - [26/Oct/2022 15:55:04] "GET /login HTTP/1.1" 200 -
172.17.0.1 - - [26/Oct/2022 15:55:04] "GET /static/styles.css HTTP/1.1" 200 -
172.17.0.1 - - [26/Oct/2022 15:55:04] "GET /favicon.ico HTTP/1.1" 404 -
172.17.0.1 - - [26/Oct/2022 15:55:08] "GET / HTTP/1.1" 200 -
172.17.0.1 - - [26/Oct/2022 15:55:08] "GET /static/styles.css HTTP/1.1" 304 -
172.17.0.1 - - [26/Oct/2022 15:58:51] "POST / HTTP/1.1" 200 -
172.17.0.1 - - [26/Oct/2022 15:58:51] "GET /static/styles.css HTTP/1.1" 304 -
172.17.0.1 - - [26/Oct/2022 15:59:19] "POST /login HTTP/1.1" 200 -
172.17.0.1 - - [26/Oct/2022 15:59:19] "GET /static/styles.css HTTP/1.1" 304 -
172.17.0.1 - - [26/Oct/2022 16:00:30] "GET /logout HTTP/1.1" 302 -
172.17.0.1 - - [26/Oct/2022 16:00:30] "GET /login HTTP/1.1" 200 -
172.17.0.1 - - [26/Oct/2022 16:00:30] "GET /static/styles.css HTTP/1.1" 304 -

```



OUTPUT

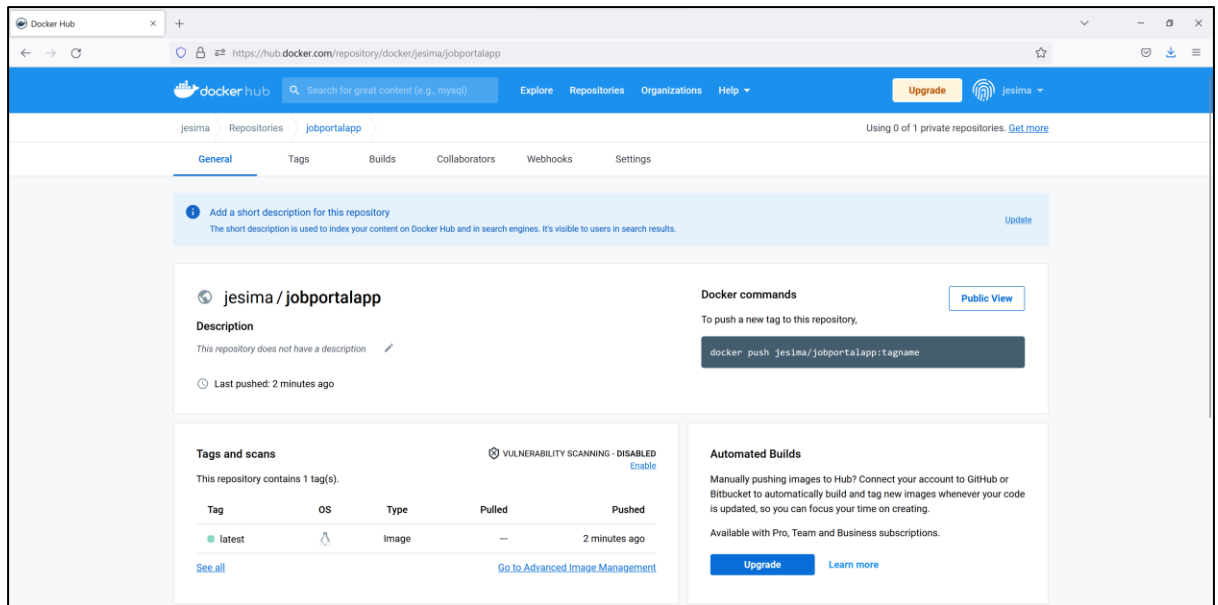




Push to Docker Hub

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  JUPYTER

PS C:\Users\Jesima A\Desktop\Assignment 4> docker push jesima/jobportalapp
Using default tag: latest
The push refers to repository [docker.io/jesima/jobportalapp]
258ffaefafa7: Pushed
af1ec9428972: Pushed
ff259168c0a0: 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: sha256:253f12c1a7188f2b976a7343a891536415e322d24a865850a4062627e84663d2 size: 2845
PS C:\Users\Jesima A\Desktop\Assignment 4> 
```



3. Create an IBM container registry and deploy helloworld app or jobportalapp.

a. Log in to IBM Cloud Account

```
C:\Users\Jesima A>ibmcloud login -a https://cloud.ibm.com
API endpoint: https://cloud.ibm.com

Email> 2019103529@student.annauniv.edu

Password>
Authenticating...
OK

Targeted account Jesima A's Account (77bb2e90befd4ac087dc7d87fcae81ec)

Select a region (or press enter to skip):
1. au-syd
2. in-che
3. jp-osa
4. jp-tok
5. kr-seo
6. eu-de
7. eu-gb
8. ca-tor
9. us-south
10. us-east
11. br-sao
Enter a number> 9
Targeted region us-south

API endpoint: https://cloud.ibm.com
Region: us-south
User: 2019103529@student.annauniv.edu
Account: Jesima A's Account (77bb2e90befd4ac087dc7d87fcae81ec)
Resource group: No resource group targeted, use 'ibmcloud target -g RESOURCE_GROUP'
CF API endpoint:
Org:
Space:

C:\Users\Jesima A>
```

b. Set desired region for namespace to be created.

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

OK

c. Create Namespace.

```
C:\Users\Jesima A>ibmcloud cr namespace-add sjr-ns-1
No resource group is targeted. Therefore, the default resource group for the account ('Default') is targeted.
Adding namespace 'sjr-ns-1' in resource group 'Default' for account Jesima A's Account in registry us.icr.io...
Successfully added namespace 'sjr-ns-1'
```

OK

```
C:\Users\Jesima A>ibmcloud cr namespace-list
Listing namespaces for account 'Jesima A's Account' in registry 'us.icr.io'...
```

```
Namespace
sjr-ns-1
```

OK

d. Log the local Docker daemon into the IBM Cloud Container Registry.

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

OK

e. Give appropriate repository name and tag.

```
C:\Users\Jesima A>docker tag job-portal-app us.icr.io/sjr-ns-1/sjr-repo-1:job-portal-app
C:\Users\Jesima A>
```

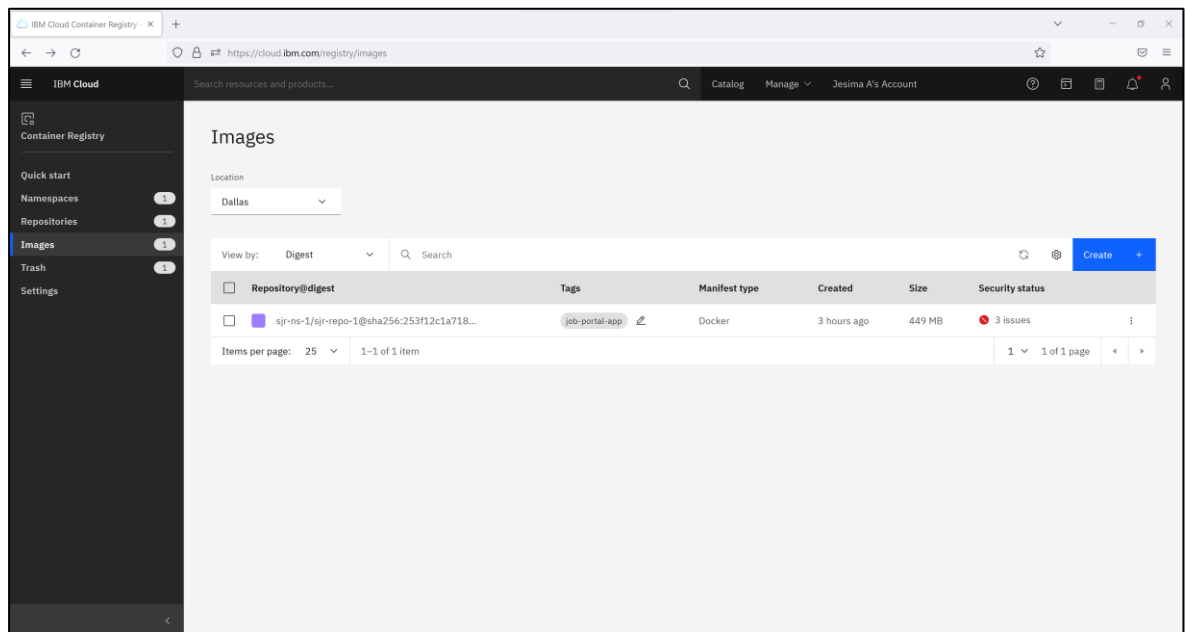
f. Push the image.

```
C:\Users\Jesima A>docker push us.icr.io/sjr-ns-1/sjr-repo-1:job-portal-app
The push refers to repository [us.icr.io/sjr-ns-1/sjr-repo-1]
258ffaefafa7: Mounted from sjr-ns-1/job-portal-app
af1ec9428972: Mounted from sjr-ns-1/job-portal-app
ff259168c0a0: Mounted from sjr-ns-1/job-portal-app
6f6e69c2c592: Mounted from sjr-ns-1/job-portal-app
53b8bfee7a0a: Mounted from sjr-ns-1/job-portal-app
5b3f1ed98915: Mounted from sjr-ns-1/job-portal-app
6b183c62e3d7: Mounted from sjr-ns-1/job-portal-app
882fd36bfd35: Mounted from sjr-ns-1/job-portal-app
d1dec9917839: Mounted from sjr-ns-1/job-portal-app
d38adf39e1dd: Mounted from sjr-ns-1/job-portal-app
4ed121b04368: Mounted from sjr-ns-1/job-portal-app
d9d07d703dd5: Mounted from sjr-ns-1/job-portal-app
job-portal-app: digest: sha256:253f12c1a7188f2b976a7343a891536415e322d24a865850a4062627e84663d2 size: 2845
C:\Users\Jesima A>
```

g. Verify that the image is in the private registry.

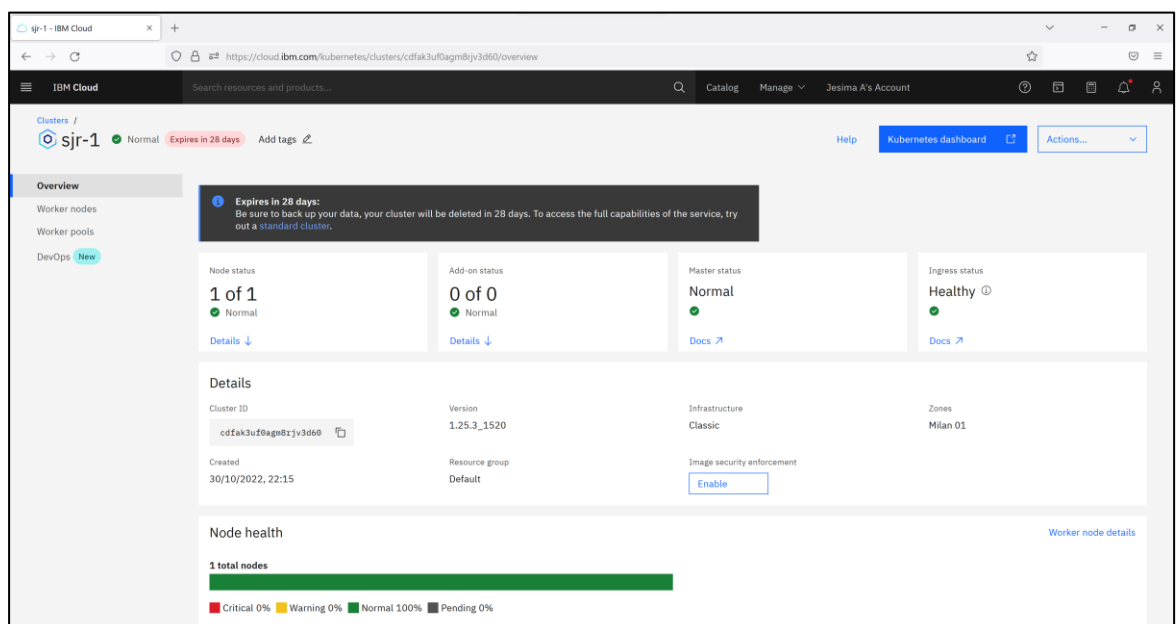
```
C:\Users\Jesima A>ibmcloud cr image-list
Listing images...

Repository      Tag      Digest      Namespace   Created      Size      Security status
us.icr.io/sjr-ns-1/sjr-repo-1  job-portal-app  253f12c1a718  sjr-ns-1    2 hours ago  449 MB    -
OK
C:\Users\Jesima A>
```



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

Create Kubernetes Cluster



Overview

Worker nodes

Worker pools

DevOps **New**

Pool: Filter... Search

| Name | Status | Worker pool | Zone | Private IP | Public IP | Version |
|---------|---|-------------|----------|----------------|-----------------|-------------|
| 00000d8 | Normal - Soft reboot request successful | default | Milan 01 | 10.144.217.101 | 159.122.177.177 | 1.24.6_1541 |

Items per page: 25 1-1 of 1 item

Deploy Application

Workloads

- Cron Jobs
- Daemon Sets
- Deployments
- Jobs
- Pods
- Replica Sets
- Replication Controllers
- Stateful Sets

Service

- Ingresses
- Ingress Classes
- Services

Config and Storage

- Config Maps
- Persistent Volume Claims
- Secrets
- Storage Classes

Cluster

- Cluster Role Bindings

Create from input Create from file **Create from form**

App name *
assign-4-app

Container image *
jesima/jobportalapp:latest

Number of pods *
1

Service *
External

Port * 5000 Target port * 5000 Protocol * TCP

Port Target port Protocol

Namespace *
default

Deploy Preview Cancel Show advanced options

Workload Status

Running 1 Deployments

Running 1 Pods

Running 1 Replica Sets

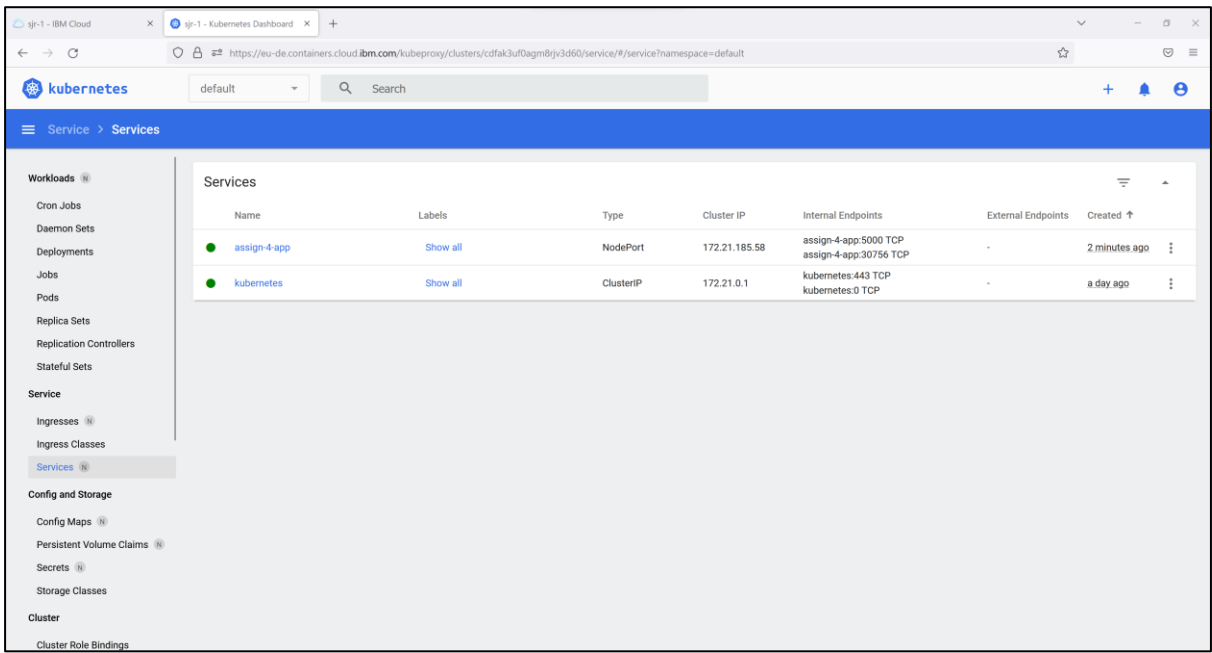
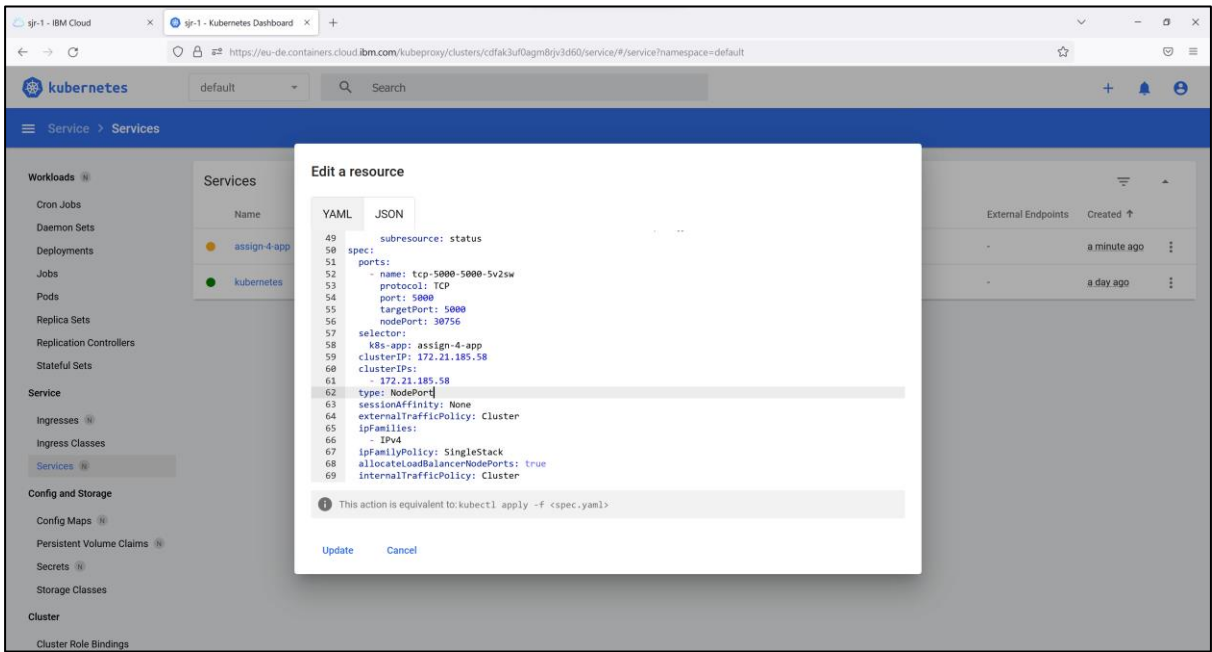
Deployments

| Name | Images | Labels | Pods | Created |
|--------------|----------------------------|-----------------------|-------|----------------|
| assign-4-app | jesima/jobportalapp:latest | k8s-app: assign-4-app | 1 / 1 | 14 minutes ago |

Pods

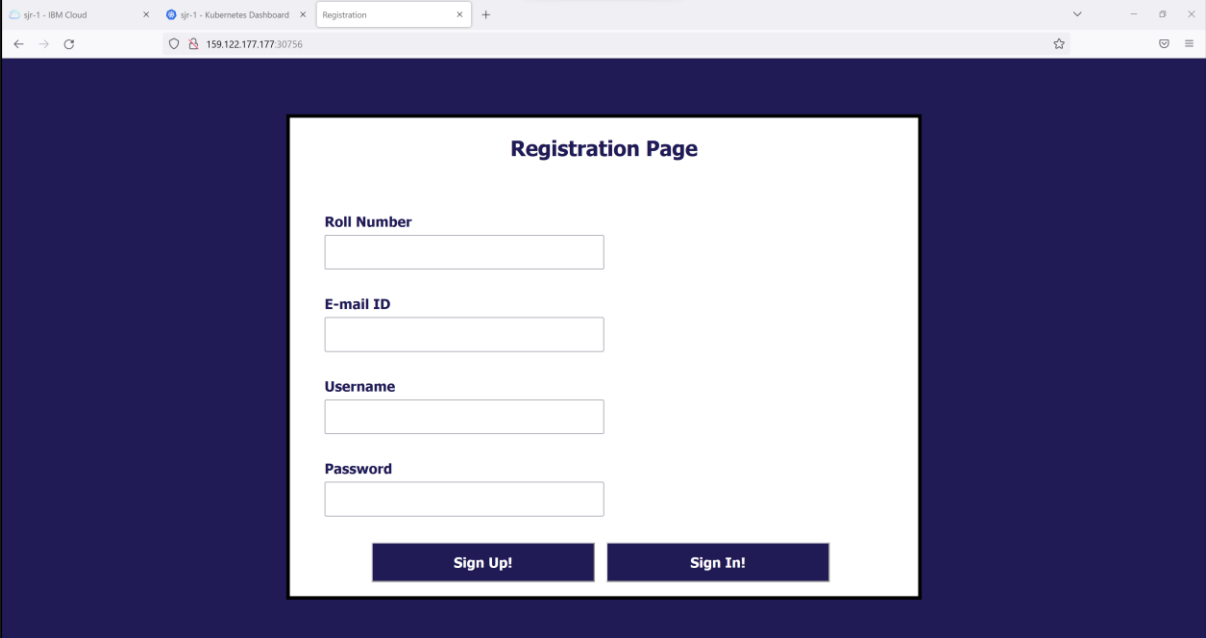
| Name | Images | Labels | Node | Status | Restarts | CPU Usage (cores) | Memory Usage (bytes) | Created |
|-----------------------------|--------|--------|----------------|---------|----------|-------------------|----------------------|----------------|
| assign-4-app-69864cb6f-qwzk | | | 10.144.217.101 | Running | 0 | 1.00m | 23.04M | 14 minutes ago |

Expose on NodePort



OUTPUT

Deployed IP: <http://159.122.177.177:30756/>



The screenshot shows a web browser window with the address bar displaying `159.122.177.177:30756`. The browser tabs include "sgn-1 - IBM Cloud", "sgn-1 - Kubernetes Dashboard", and "Registration". The main content area features a dark blue background with a white registration form titled "Registration Page". The form contains the following fields and buttons:

- Roll Number**: A text input field.
- E-mail ID**: A text input field.
- Username**: A text input field.
- Password**: A text input field.
- Sign Up!**: A dark blue button with white text.
- Sign In!**: A dark blue button with white text.