

ASSIGNMENT-4 DOCKER AND KUBERNETES



Assignment Date	25 November 2022
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Maximum Marks	2 Marks

Question-1:

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

03:47:04

CLOSE SESSION

Instances  

+ ADD NEW INSTANCE

192.168.0.8
node1

cdjvhaf9_cdjvmjm0qau0008f5ccg

IP
192.168.0.8

OPEN PORT

Memory

SSH
ssh ip172-18-0-14-cdjvhaf91rrg00fv78h0@direct.labs.play-witl

DELETE

EDITOR

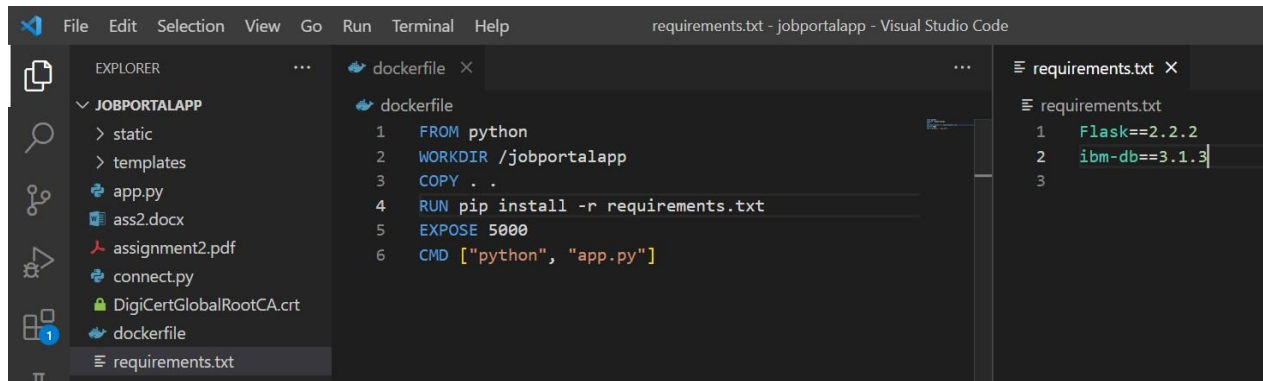
CPU

```
# This is a sandbox environment. Using personal credentials #
# is HIGHLY! discouraged. Any consequences of doing so are #
# completely the user's responsibilities. #
# The FWD team. #
#####
[node1] (local) root@192.168.0.8 ~
$ docker pull ubuntu:20.04
20.04: Pulling from library/ubuntu
eaead16dc43b: Pull complete
Digest: sha256:450e066588f42ebe1551f3b1a535034b6aa46cd936fe7f2c6b0d72997ec61dbd
Status: Downloaded newer image for ubuntu:20.04
docker.io/library/ubuntu:20.04
[node1] (local) root@192.168.0.8 ~
$ docker images
REPOSITORY TAG IMAGE ID CREATED SIZE
ubuntu 20.04 680e5dfb52c7 12 days ago 72.8MB
[node1] (local) root@192.168.0.8 ~
$ docker run -it ubuntu:20.04 bash
root@1e3bae34d1e9:/# hostname
```

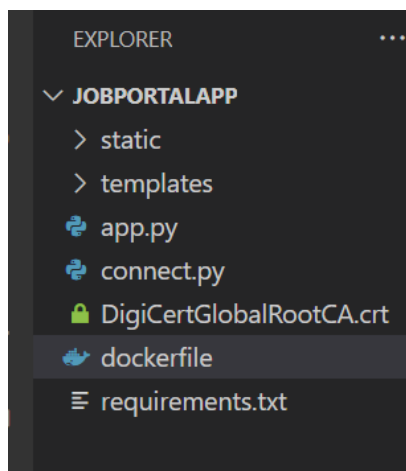
Question-2:

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

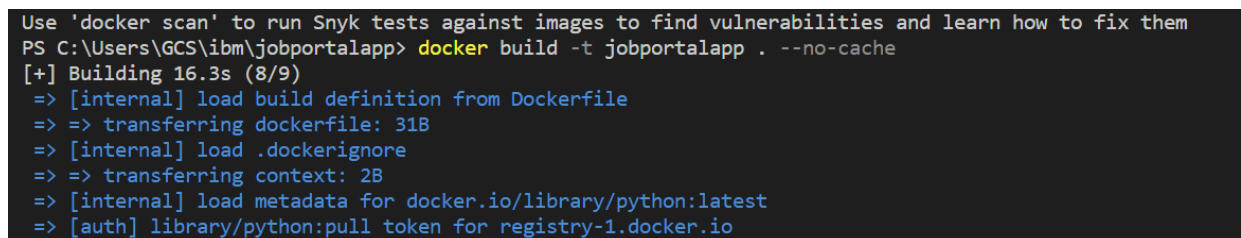
Dockerfile and Requirements.txt :



File structure:



Building a docker image:



```

=> [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

Docker Desktop Upgrade plan

Images on disk Last refresh: about 18 hours ago 4 images 1.19 GB total size 0 Bytes / 1.19 GB in use

Images Give feedback

LOCAL REMOTE REPOSITORIES

Search

☐ In use only

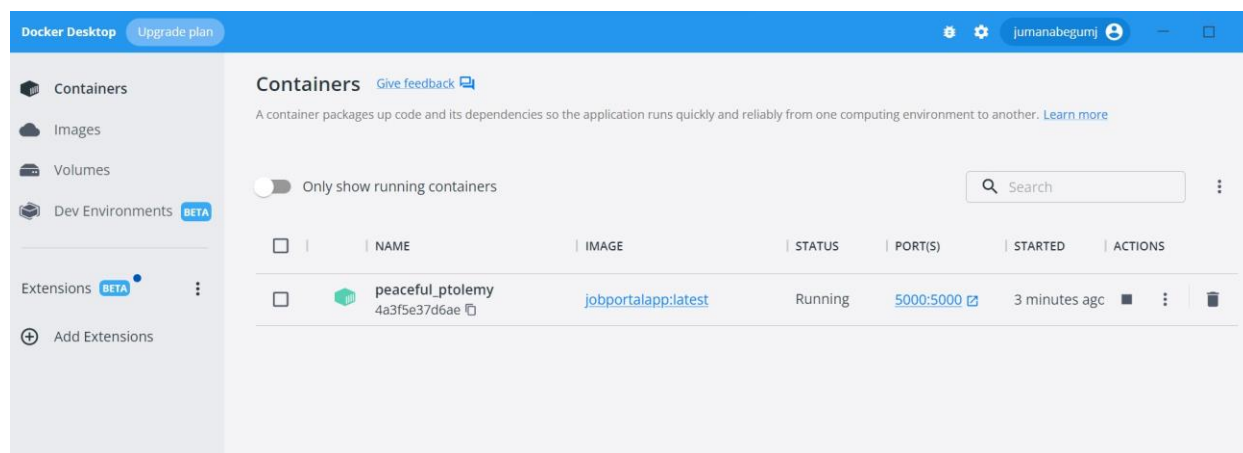
NAME ↑	TAG	IMAGE ID	CREATED	SIZE
alpine/git	latest	42a1cda0ba24	18 days ago	43.61 MB
docker101tutorial	latest	fbda065df936	about 20 hours ago	28.94 MB
jobportalapp	latest	eafcf73ce6c5	less than a minute ago	1.12 GB
jumanabegumj/docker101...	latest	fbda065df936	about 20 hours ago	28.94 MB

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 -


```




```
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
53b8bfef7a0a: 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
```

Wasm is a fast, light alternative to Linux containers – try it out today in the [Docker+Wasm Technical Preview](#)

 dockerhub

[Explore](#) [Repositories](#) [Organizations](#) [Help](#)

[Upgrade](#)

 jumanabegumj

[Create repository](#)

jumanabegumj / jobportalapp


Contains: Image | Last pushed: 35 minutes ago

Not Scanned

0

1

Public



Tip: Not finding your repository? Try a different namespace.

Question-3

Create an IBM container registry and deploy helloworld or jobportal app

Log into ibm cloud using ibm cloud CLI

```
C:\Users\GCS>ibmcloud login
API endpoint: https://cloud.ibm.com

Email> 2019103022@student.annauniv.edu

Password>
Authenticating...
OK

Targeted account Jumana Begum J's Account (20acf123c7c641a0a4d73e3afab989d2)

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:             2019103022@student.annauniv.edu
Account:          Jumana Begum J's Account (20acf123c7c641a0a4d73e3afab989d2)
Resource group:    No resource group targeted, use 'ibmcloud target -g RESOURCE_GROUP'
CF API endpoint:
Org:
Space:
```

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
its 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>
```

IBM Cloud

Container Registry

Quick start

Namespaces1

Repositories1

Images1

Trash0

Settings

Search resources and products...


CatalogManageJumana Begum J's Acc...

Images

Location

Dallas

View by: DigestSearch

<input type="checkbox"/>	Repository@digest	Tags	Manifest type	Created	Size	
<input type="checkbox"/>	 jum-ns-1/repo1@sha256:757e93556ceb...	jobportalapp	Docker	3 hours ago	449 MB	

Items per page: 251-1 of 1 item

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

The screenshot shows the IBM Cloud Clusters dashboard for a cluster named 'mycluster-free'. The cluster is in the 'Preparing master, workers...' state, indicated by a green progress bar. A warning banner states 'Expires in 30 days: Be sure to back up your data, your cluster will be deleted in 30 days. To access the full capabilities of the service, try out a standard cluster.' The dashboard includes a sidebar with 'Overview', 'Worker nodes', 'Worker pools', and 'DevOps' (marked as 'New'). The main content area displays four status cards: 'Node status' (1 of 1 Pending), 'Add-on status' (0 of 0 Normal), 'Master status' (Unknown), and 'Ingress status' (Pending). Below these is a 'Details' section showing the Cluster ID (cdki752f04dhk3s1i3ug), Version (1.24.7_1542), Infrastructure (Classic), and Zones (Milan 01).

IBM Cloud Search resources and products... Catalog Manage Jumana Begum J's Acc... Help Kubernetes dashboard Actions...

Clusters / mycluster-free

Preparing master, workers... Expires in 30 days Add tags

Overview

Worker nodes

Worker pools

DevOps **New**

Expires in 30 days:
Be sure to back up your data, your cluster will be deleted in 30 days. To access the full capabilities of the service, try out a [standard cluster](#).

Node status
1 of 1
Pending
[Details](#)

Add-on status
0 of 0
Normal
[Details](#)

Master status
Unknown
[Docs](#)

Ingress status
Pending
[Docs](#)

Details

Cluster ID	Version	Infrastructure	Zones
cdki752f04dhk3s1i3ug	1.24.7_1542	Classic	Milan 01

The screenshot shows the 'Worker nodes' tab in the IBM Cloud Clusters dashboard. The cluster 'mycluster-free' is now in a 'Normal' state, indicated by a green checkmark. The 'Expires in 30 days' warning remains. The 'Worker nodes' tab is selected in the sidebar. The main content area displays a table of worker nodes. The table has columns for Name, Status, Worker pool, Zone, Private IP, Public IP, and Version. There is one node listed with ID 00000032, status Normal, worker pool default, and zone Milan 01. The table also includes a search bar, a filter dropdown, and pagination controls.

IBM Cloud Search resources and products... Catalog Manage Jumana Begum J's Acc... Help Kubernetes dashboard Actions...

Clusters / mycluster-free **Normal** Expires in 30 days Add tags

Overview

Worker nodes

Worker pools


DevOps **New**

Pool: Filter... Search **Add**


Name	Status	Worker pool	Zone	Private IP	Public IP	Version
00000032	Normal	default	Milan 01	10.144.185.58	169.51.203.185	1.24.7_1543




Items per page: 25 1-1 of 1 item 1 1 of 1 page

Access the Kubernetes dashboard and deploy the application image

 **kubernetes**

default

 Search

Overview

Workloads

Cron Jobs

Daemon Sets

Deployments

Jobs

Pods

Replica Sets

Replication Controllers

Stateful Sets

Service

Ingresses

Ingress Classes

Services

Config and Storage

Workloads

Workload Status

Pending: 1

Deployments


Pending: 1

Pods


Pending: 1

Replica Sets


Deployments

Name	Images	Labels	Pods	Created
 jobportalapp	Show all	Show all	1 / 1	54 seconds ago

Pods

Name	Images	Labels	Node	Status	Restarts	CPU Usage (cores)	Memory Usage (bytes)	Created
 jobportalapp-9dd69c877-25mg6	Show all	Show all	10.144.185.58	Running	0	-	-	54 seconds ago

Replica Sets

Name	Images	Labels	Pods	Created
 jobportalapp-9dd69c877	Show all	Show all	1 / 1	55 seconds ago

In services tab edit the YAML file of the jobportal application

Edit a resource

YAML	JSON
50 spec:	
51 ports:	
52 - name: tcp-5000-488-ct4tf	
53 protocol: TCP	
54 port: 5000	
55 targetPort: 5000	
56 nodePort: 32576	
57 selector:	
58 k8s-app: jobportalapp	
59 clusterIP: 172.21.63.60	
60 clusterIPs:	
61 - 172.21.63.60	
62 type: NodePort	
63 sessionAffinity: None	
64 externalTrafficPolicy: Cluster	
65 ipFamilies:	
66 - IPv4	
67 ipFamilyPolicy: SingleStack	
68 allocateLoadBalancerNodePorts: true	
69 internalTrafficPolicy: Cluster	
70 status:	
71 loadBalancer: {}	
72	

Update

Cancel

OUTPUT:



The image shows a web browser window with a purple gradient background. At the top center, the text "REGISTRATION PORTAL" is displayed in bold black font. Below this, a white rectangular form is centered. Inside the form, there are four input fields with labels to their left: "Email ID:" followed by a text box containing "begumjumana2712@gmail.", "User Name:" followed by a text box containing "Jumana Begum J", "Password:" followed by a text box containing seven asterisks "*****", and "Roll Number:" followed by a text box containing "2019103022". Below the input fields, there are two buttons: a "LOGIN" button on the left and a "Submit" button on the right.

REGISTRATION PORTAL

Email ID:

User Name:

Password:

Roll Number:

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