

Assignment 4

Docker and Kubernetes

Date	12 November 2022
Team ID	PNT2022TMID03825
Project Name	Project - Inventory Management For Retailers
Maximum Marks	2 Marks

Question 1:

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

Pulling hello-world image from docker:

```
docker run hello-world
```

```
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
2db29710123e: Pull complete
Digest: sha256:faa03e786c97f07ef34423fccceeec2398ec8a5759259f94d99078f264e9d7af
Status: Downloaded newer image for hello-world:latest
```

```
Hello from Docker!
This message shows that your installation appears to be working correctly.
```

To generate this message, Docker took the following steps:

1. The Docker client contacted the Docker daemon.
2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
(amd64)
3. The Docker daemon created a new container from that image which runs the executable that produces the output you are currently reading.
4. The Docker daemon streamed that output to the Docker client, which sent it to your terminal.

To try something more ambitious, you can run an Ubuntu container with:

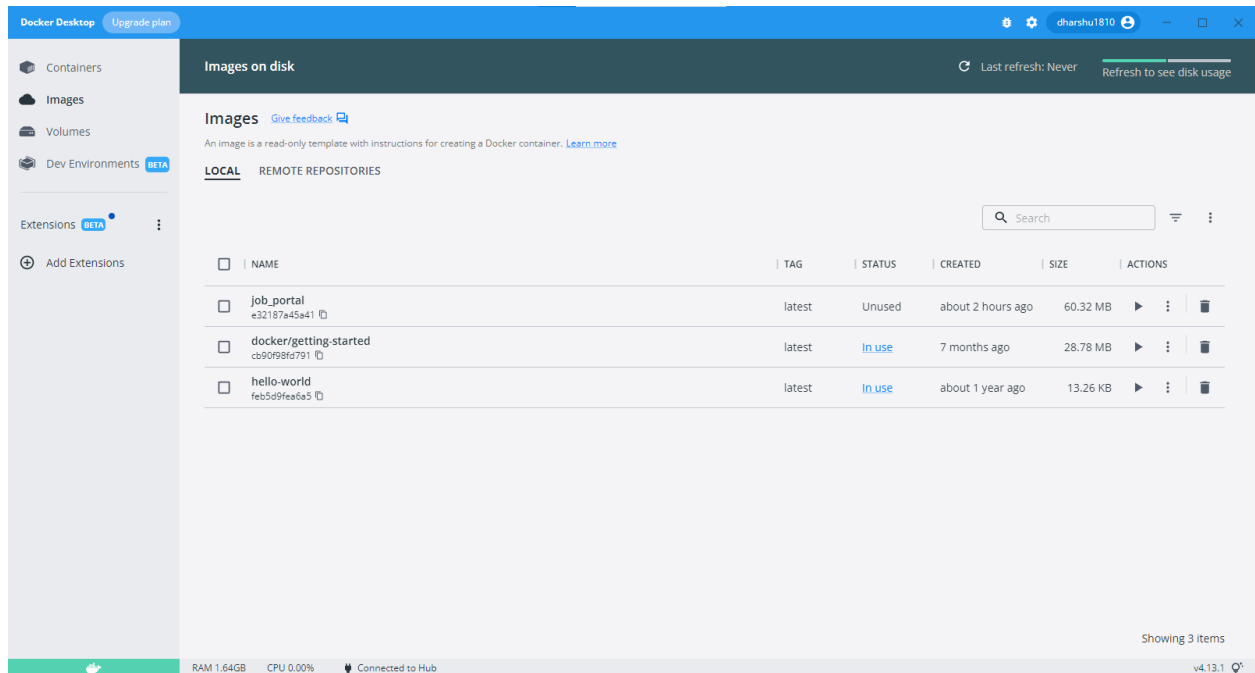
```
$ docker run -it ubuntu bash
```

Share images, automate workflows, and more with a free Docker ID:

<https://hub.docker.com/>

For more examples and ideas, visit:

<https://docs.docker.com/get-started/>



Running docker image:

```
Hello from Docker!
This message shows that your installation appears to be working correctly.

To generate this message, Docker took the following steps:
 1. The Docker client contacted the Docker daemon.
 2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
    (amd64)
 3. The Docker daemon created a new container from that image which runs the
    executable that produces the output you are currently reading.
 4. The Docker daemon streamed that output to the Docker client, which sent it
    to your terminal.

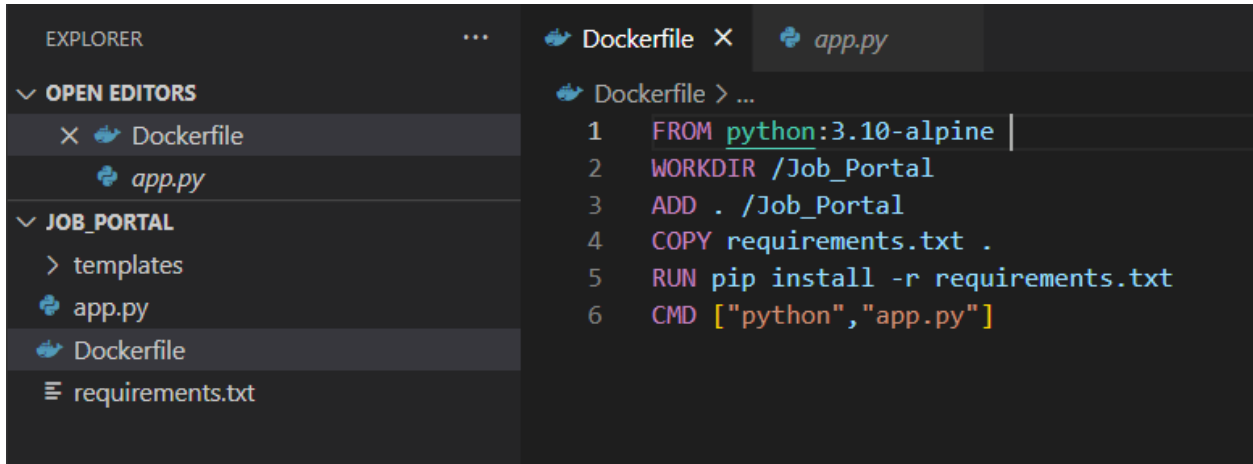
To try something more ambitious, you can run an Ubuntu container with:
$ docker run -it ubuntu bash

Share images, automate workflows, and more with a free Docker ID:
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```

Question 2:

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



The screenshot shows a code editor with two files open: `Dockerfile` and `app.py`. The `Dockerfile` contains the following instructions:

```
Dockerfile > ...  
1 FROM python:3.10-alpine  
2 WORKDIR /Job_Portal  
3 ADD . /Job_Portal  
4 COPY requirements.txt .  
5 RUN pip install -r requirements.txt  
6 CMD ["python", "app.py"]
```

The Explorer sidebar on the left shows the project structure:

- EXPLORER
 - OPEN EDITORS
 - Dockerfile
 - app.py
 - JOB_PORTAL
 - templates
 - app.py
 - Dockerfile
 - requirements.txt

Dockerfile:

```
FROM python:3.10-alpine
```

```
WORKDIR /Job_Portal
```

```
ADD . /Job_Portal
```

```
COPY requirements.txt .
```

```
RUN pip install -r requirements.txt
```

```
CMD ["python", "app.py"]
```

Flask web app for job portal:

Post Job

IBM Organization
Banglore
Software Engineer
B.E CSE/IT/ECE, M.E CSE/IT
0-5 years
7-12 LPA
0
Asap

Submit

Organization Name: IBM Organization
 Location: Bangalore
 Job Role: Software Engineer
 Eligibility: B.E CSE/IT/ECE, M.E CSE/IT
 Experience: 0-5 years
 Compensation 7-12 LPA
 Service Agreement: 0
 Apply Within: Asap

```

EXPLORER
OPEN EDITORS
  Dockerfile
  app.py
JOB_PORTAL
  templates
  app.py
  Dockerfile
  requirements.txt

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL JUPYTER
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\dharsini\Desktop\Job_Portal> docker image build -t job_portal .
[*] Building 36.1s (11/11) FINISHED
=> [internal] load build definition from Dockerfile                                1.2s
=> => transferring dockerfile: 32B                                              0.1s
=> [internal] load .dockerignore                                                0.8s
=> => transferring context: 2B                                                  0.1s
=> [internal] load metadata for docker.io/library/python:3.10-alpine          6.4s
=> [auth] library/python:pull token for registry-1.docker.io                 0.0s
=> [internal] load build context                                              0.5s
=> => transferring context: 244B                                               0.0s
=> [1/5] FROM docker.io/library/python:3.10-alpine@sha256:bf95e439d1d6cc0402da13c92242eb7257f6ab075efbd2babfbcea114d061 0.5s
=> => resolve docker.io/library/python:3.10-alpine@sha256:bf95e439d1d6cc0402da13c92242eb7257f6ab075efbd2babfbcea114d061 0.5s
=> CACHED [2/5] WORKDIR /Job_Portal                                           0.0s
=> [3/5] ADD . /Job_Portal                                                    1.0s
=> [4/5] COPY requirements.txt .                                              2.9s
=> [5/5] RUN pip install -r requirements.txt                                  18.3s
=> exporting to image                                                         4.3s
=> => exporting layers                                                         3.6s
=> => writing image sha256:e32187a45a419f86c58c2b9c447f629cf27e012802bf2adfafbf8c8c0a7a651e6 0.2s
=> => naming to docker.io/library/job_portal                                  0.1s
    
```

Containers

Images

Volumes

Dev Environments BETA

Extensions BETA

Add Extensions

Images on disk

Images [Give feedback](#)

An image is a read-only template with instructions for creating a Docker container. [Learn more](#)

LOCAL

REMOTE REPOSITORIES

Search

	NAME	TAG	STATUS	CREATED	SIZE	ACTIONS
<input type="checkbox"/>	job_portal e32187a45a41	latest	Unused	about 2 hours ago	60.32 MB	▶ ⋮ 🗑
<input type="checkbox"/>	docker/getting-started cb90f98fd791	latest	In use	7 months ago	28.78 MB	▶ ⋮ 🗑
<input type="checkbox"/>	hello-world feb5d9fea5a5	latest	In use	about 1 year ago	13.26 KB	▶ ⋮ 🗑

Showing 3 items

RAM 1.64GB

CPU 0.00%

Connected to Hub

v4.13.1

Question 3:

Create a IBM container registry and deploy helloworld app or jobportalapp.

```
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% 2s
12476416 bytes downloaded
Installing binary...
Plug-in 'container-registry 1.0.2' was successfully installed into C:\Users\dharshini\bluemix\plugins\container-registry. Use 'ibmcloud plugin show container-registry' to show its details.
C:\Users\dharshini>ibmcloud plugin list
Listing installed plug-ins...
Plugin Name      Version  Status  Private endpoints supported
container-registry 1.0.2    true
```

Pushing jobportal image to container registry

```
C:\Users\dharshini>docker push icr.io/myassignment/myrepo:jobportal
The push refers to repository [icr.io/myassignment/myrepo]
fcba356b279f: Pushed
3021648f56fd: Pushed
2228cb72ea5e: Pushed
10247be4aa41: Pushed
be6b216728ff: Pushed
b9a7a7381abe: Pushed
2306fb7a5a47: Pushed
6666686122fd: Pushed
994393dc58e7: Pushed
jobportal: digest: sha256:bfd315e5345623a9459154469a742417515c27cf709acf0bcc7b6c55f85bde48 size: 2201

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

Repository          Tag          Digest          Namespace      Created      Size      Security status
icr.io/myassignment/myrepo  jobportal    bfd315e53456    myassignment   5 hours ago  24 MB    -
```

The screenshot shows the IBM Cloud Container Registry interface. On the left, a sidebar contains navigation links: 'Quick start', 'Namespaces', 'Repositories', 'Images' (highlighted), 'Trash', and 'Settings'. The main area is titled 'Images' and shows a table of images. The table has columns for 'Repository@digest', 'Tags', 'Manifest type', 'Created', 'Size', and 'Security status'. One image is listed: 'myassignment/myrepo@sha256:bfd315e53456...' with the tag 'jobportal', a size of '24 MB', and a security status of 'Unscanned'. The bottom of the table shows pagination: 'Items per page: 25' and '1-1 of 1 item'.

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 nodeport.

IBM Cloud

Search resources and products...

Catalog

Manage

Dharshini T's Account

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
000000aa	Normal	default	Milan 01	10.144.180.66	169.51.195.251	1.24.7_1543

Items per page: 25

1-1 of 1 item

1 of 1 page

```

Administrator: Windows PowerShell

PS C:\Windows\system32> kubectl run jobportal --image=icr.io/myassignment/myrepo
pod/jobportal created
PS C:\Windows\system32> kubectl describe nodes
Name:                docker-desktop
Roles:               control-plane
Labels:              beta.kubernetes.io/arch=amd64
                    beta.kubernetes.io/os=linux
                    kubernetes.io/arch=amd64
                    kubernetes.io/hostname=docker-desktop
                    kubernetes.io/os=linux
                    node-role.kubernetes.io/control-plane=
                    node.kubernetes.io/exclude-from-external-load-balancers=
Annotations:         kubeadm.alpha.kubernetes.io/cri-socket: unix:///var/run/cni-dockerd.sock
                    node.alpha.kubernetes.io/ttl: 0
                    volumes.kubernetes.io/controller-managed-attach-detach: true
CreationTimestamp:   Sat, 12 Nov 2022 21:10:15 +0530
Taints:              <none>
Unschedulable:      false
Lease:
  HolderIdentity:    docker-desktop
  AcquireTime:       <unset>
  RenewTime:         Sat, 12 Nov 2022 21:44:53 +0530
Conditions:
  Type             Status  LastHeartbeatTime             LastTransitionTime             Reason                           Message
  ----             -
MemoryPressure    False   Sat, 12 Nov 2022 21:44:31 +0530 Sat, 12 Nov 2022 21:10:08 +0530 KubeletHasSufficientMemory      kubelet has sufficient memory available
DiskPressure      False   Sat, 12 Nov 2022 21:44:31 +0530 Sat, 12 Nov 2022 21:10:08 +0530 KubeletHasNoDiskPressure        kubelet has no disk pressure
PIDPressure       False   Sat, 12 Nov 2022 21:44:31 +0530 Sat, 12 Nov 2022 21:10:08 +0530 KubeletHasSufficientPID         kubelet has sufficient PID available
Ready             True    Sat, 12 Nov 2022 21:44:31 +0530 Sat, 12 Nov 2022 21:10:49 +0530 KubeletReady                     kubelet is posting ready status
Addresses:
  InternalIP: 192.168.65.4
  Hostname:   docker-desktop
Capacity:
  cpu:                4
  ephemeral-storage:  263174212Ki
  hugepages-1Gi:      0
  hugepages-2Mi:      0
  memory:             6234028Ki
  pods:              110
Allocatable:
  cpu:                4
  ephemeral-storage:  242541353378
  hugepages-1Gi:      0
  hugepages-2Mi:      0
  memory:             6131628Ki
  pods:              110
System Info:
  Machine ID:         7e926ddc-1750-4076-a1e1-4a3007910195
  System UUID:        7e926ddc-1750-4076-a1e1-4a3007910195
  Boot ID:            867f5d08-2ce4-48cf-8ec4-654bdd993cc7
  Kernel Version:     5.10.102.1-microsoft-standard-WSL2
  OS Image:           Docker Desktop
  Operating System:    linux
  Architecture:       amd64
  Container Runtime Version: docker://20.10.20
  Kubelet Version:     v1.25.2
  Kube-Proxy Version:  v1.25.2
Non-terminated Pods:  (10 in total)
Namespace             Name           CPU Requests  CPU Limits  Memory Requests  Memory Limits  Age
-----

```

Workloads > Deployments

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

CPU Usage

The CPU Usage graph displays a horizontal green bar at a constant level of approximately 0.003 cores, indicating steady, low CPU consumption over the one-hour period.

Memory Usage

The Memory Usage graph displays a horizontal blue bar at a constant level of approximately 10 MiB, indicating steady, low memory consumption over the one-hour period.

Deployments

Name	Images	Labels	Pods	Created ↑
● job-portal-app	Show all	Show all	1 / 1	14 minutes ago