

## 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:faa03e786c97f07ef34423fccceec2398ec8a5759259f94d99078f264e9d7af
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:

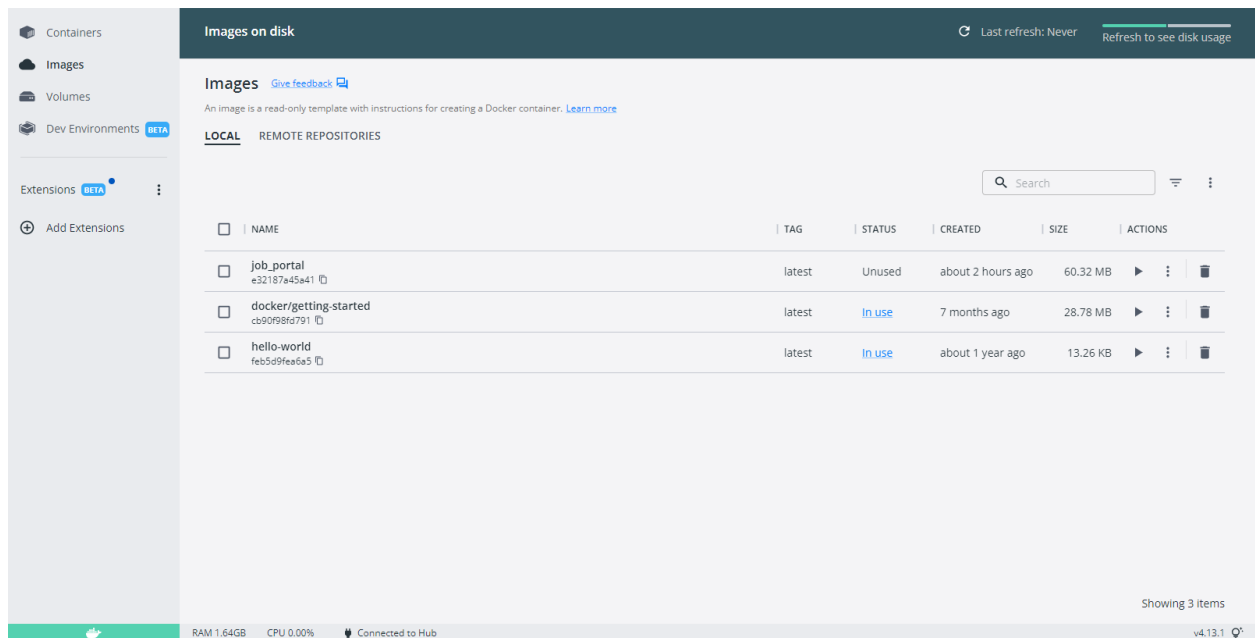
```
$ docker run -it ubuntu bash
```

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.

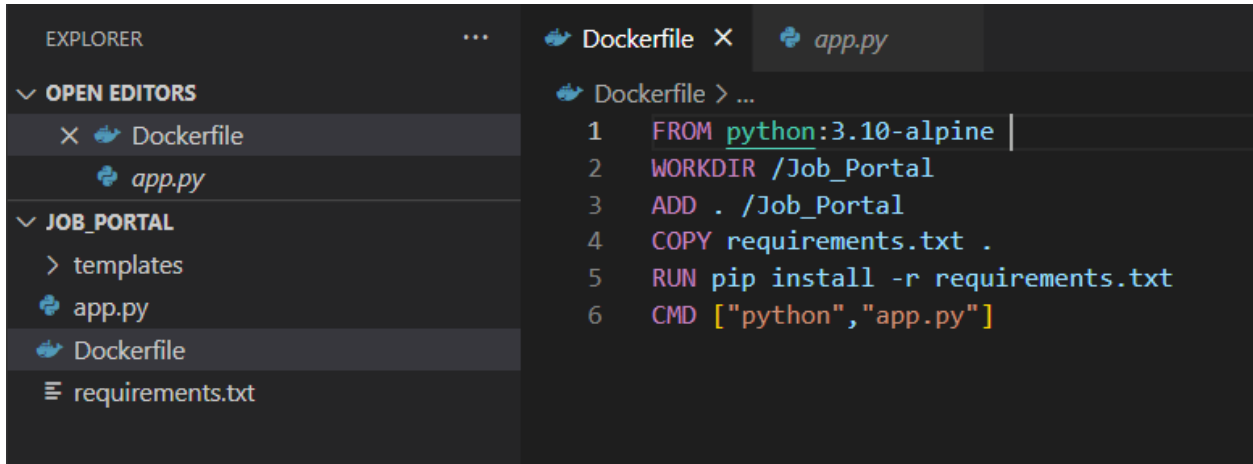
To try something more ambitious, you can run an Ubuntu container with:
$ docker run -it ubuntu bash

Share images, automate workflows, and more with a free Docker ID:
https://hub.docker.com/

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https://docs.docker.com/get-started/
```

## 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:

```
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:

- 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\dhharshini\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

Last refresh: Never Refresh to see disk usage

Images [Give feedback](#)

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

LOCAL

REMOTE REPOSITORIES

Search

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

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\dhharshini\bluemix\plugins\container-registry. Use 'ibmcloud plugin show container-registry' to show its details.
C:\Users\dhharshini>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\dhharshini>docker push icr.io/myassignment/myrepo:jobportal
The push refers to repository [icr.io/myassignment/myrepo]
fcb3a356b279f: 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\dhharshini>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    -
```

Container Registry

Quick start

Namespaces

Repositories

Images

Trash

Settings

### Images

Location: Global

View by: Digest

Search

Repository@digest	Tags	Manifest type	Created	Size	Security status
myassignment/myrepo@sha256:bfd315e53456...	jobportal	Docker	5 hours ago	24 MB	Unscanned

Items per page: 25

1-1 of 1 item

1 1 of 1 page

### 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.

Clusters /

mycluster-free

Normal

Expires in 30 days

Add tags

Help

Kubernetes dashboard

Actions...

Overview

Worker nodes

Worker pools

DevOps New

Pool: Filter...

Q Search

⚙ Add +

<input type="checkbox"/>	Name	Status	Worker pool	Zone	Private IP	Public IP	Version
▼ <input type="checkbox"/>	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 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: 807f5d08-2ce4-48cf-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
```

```
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:             867f5dd8-2ce4-48cf-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
  -----
  default            jobportal                           0 (0%)        0 (0%)      0 (0%)          0 (0%)         12m
  kube-system        coredns-95db45d46-6d514            100m (2%)     0 (0%)      70Mi (1%)       170Mi (2%)     33m
  kube-system        coredns-95db45d46-6nfzk            100m (2%)     0 (0%)      70Mi (1%)       170Mi (2%)     33m
  kube-system        etcd-docker-desktop               100m (2%)     0 (0%)      100Mi (1%)      0 (0%)         34m
  kube-system        kube-apiserver-docker-desktop      250m (6%)     0 (0%)      0 (0%)          0 (0%)         33m
  kube-system        kube-controller-manager-docker-desktop 200m (5%)     0 (0%)      0 (0%)          0 (0%)         34m
  kube-system        kube-proxy-gcmw7                  0 (0%)        0 (0%)      0 (0%)          0 (0%)         33m
  kube-system        kube-scheduler-docker-desktop      100m (2%)     0 (0%)      0 (0%)          0 (0%)         34m
  kube-system        storage-provisioner                0 (0%)        0 (0%)      0 (0%)          0 (0%)         32m
  kube-system        vpnkit-controller                  0 (0%)        0 (0%)      0 (0%)          0 (0%)         32m
Allocated resources:
  (Total limits may be over 100 percent, i.e., overcommitted.)
  Resource           Requests  Limits
  -----
  cpu                850m (21%)  0 (0%)
  memory             240Mi (4%)  340Mi (5%)
  ephemeral-storage  0 (0%)      0 (0%)
  hugepages-1Gi      0 (0%)      0 (0%)
  hugepages-2Mi      0 (0%)      0 (0%)
Events:
  Type    Reason      Age    From    Message
  ----    -
  Normal  Starting    33m    kube-proxy
  Normal  RegisteredNode 33m    node-controller Node docker-desktop event: Registered Node docker-desktop in Controller
```

kubernetes

default

Search

Workloads > Deployments

Workloads

Cron Jobs

Daemon Sets

Deployments

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Replication Controllers

Stateful Sets

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Ingresses

Ingress Classes

Services

Config and Storage

Config Maps

Persistent Volume Claims

Secrets

Storage Classes

CPU Usage

Memory Usage

Deployments