

Assignment-4

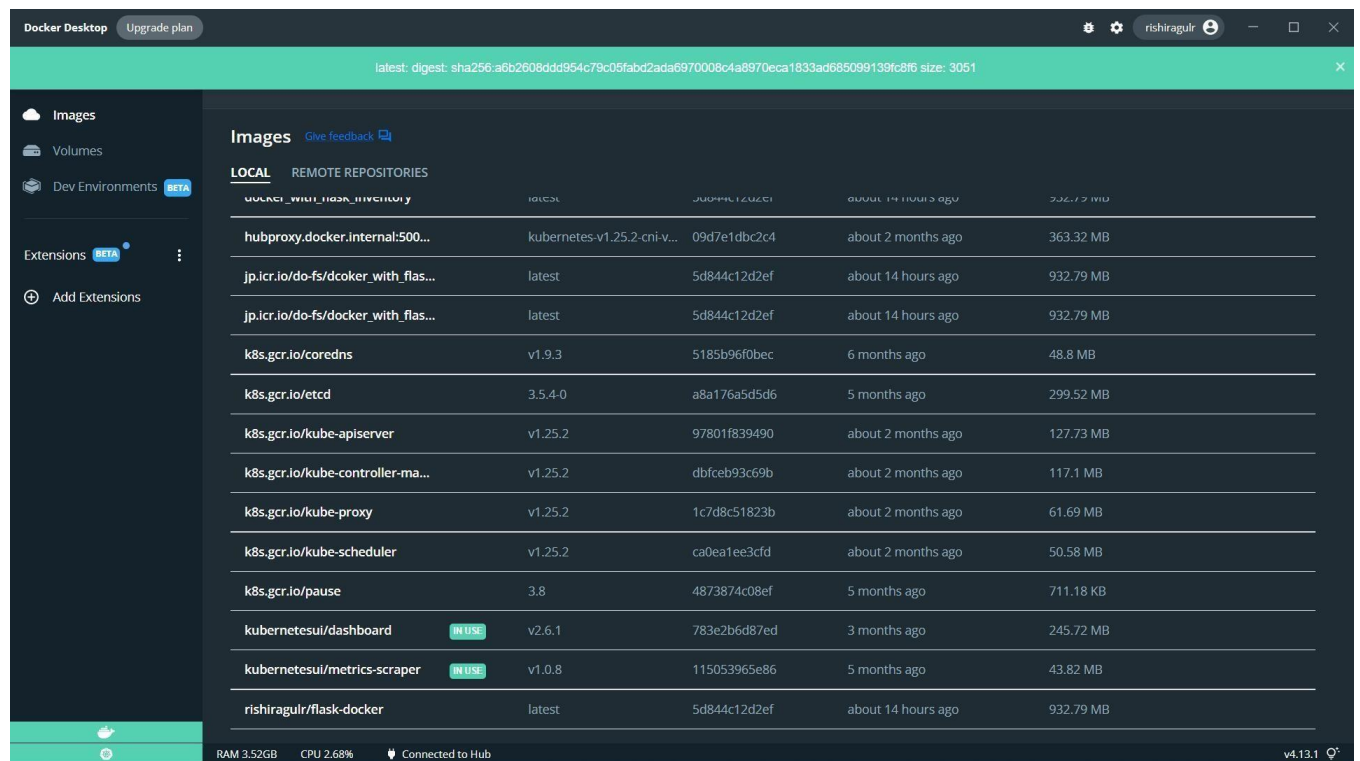
Assignment Date	29 October 2022
Student Name	Prem V
Student Roll Number	610519104080
Maximum Marks	2 Marks

Question:

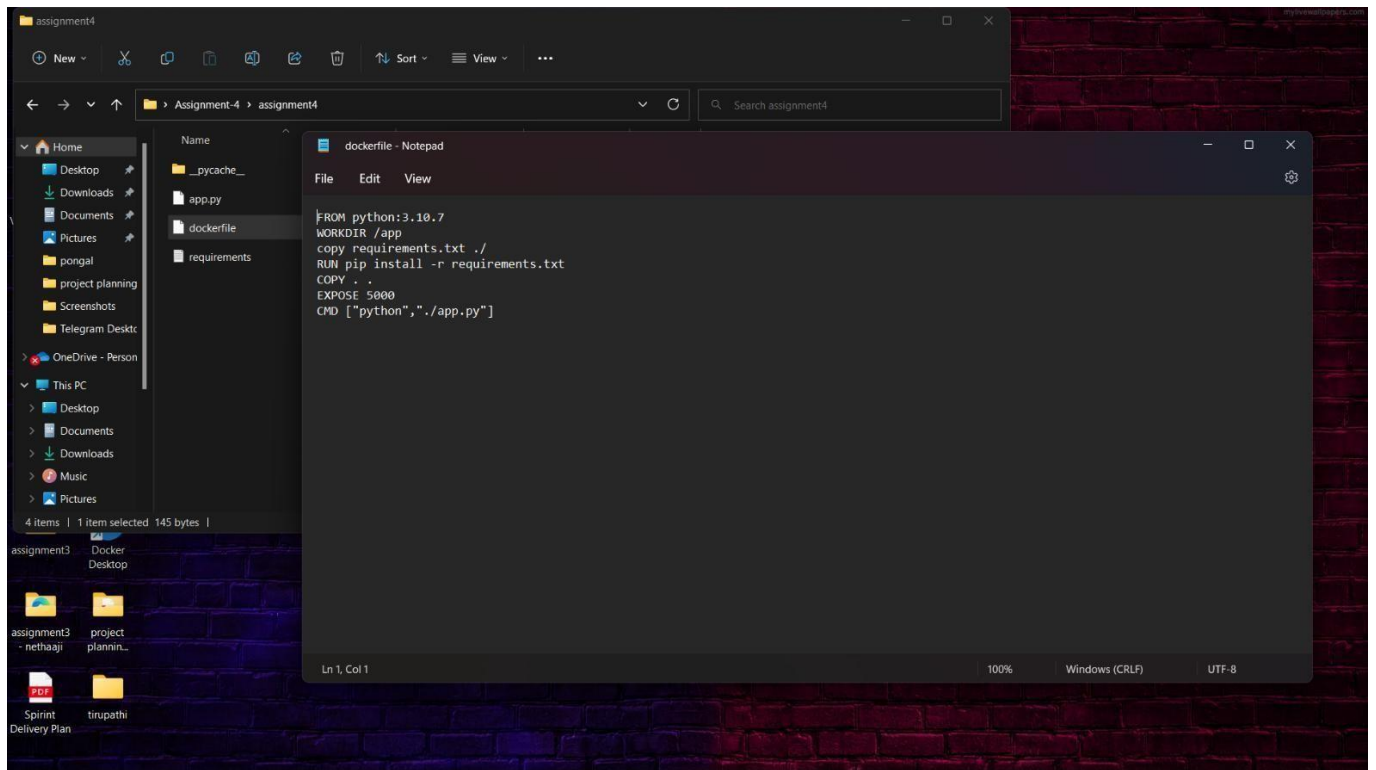
1. Pull an Image from docker hub and run it in docker playground.

```
Windows PowerShell
PS C:\Users\RISHI> docker images
REPOSITORY                                TAG                                IMAGE ID            CREATED             SIZE
docker_with_flask_inventory              latest                            5d844c12d2ef       18 hours ago       933MB
rishiragunr/flask-docker                latest                            5d844c12d2ef       18 hours ago       933MB
jp.icr.io/do-fs/docker_with_flask_inventory latest                            5d844c12d2ef       18 hours ago       933MB
hubproxy.docker.internal:5000/docker/desktop-kubernetes kubernet...-v1.25.2-cni-v1.1.1-critools-v1.24.2-cri-dockerd-v0.2.5-1-debian 09d7e1d8c2c4       6 weeks ago        363MB
k8s.gcr.io/kube-apiserver                v1.25.2                          97801f839490       7 weeks ago        128MB
k8s.gcr.io/kube-scheduler                v1.25.2                          ca0ea1ee3cfd       7 weeks ago        50.6MB
k8s.gcr.io/kube-controller-manager       v1.25.2                          dbfceb93c69b       7 weeks ago        117MB
k8s.gcr.io/kube-proxy                    v1.25.2                          1c7d8c51823b       7 weeks ago        61.7MB
kubernetes/dashboard                    v2.6.1                          783e2b6d87ed       2 months ago       246MB
k8s.gcr.io/pause                         3.0                             4873874c08ef       4 months ago       711kB
k8s.gcr.io/etcd                          3.5.4-0                         a8a176a5d5d6       5 months ago       300MB
kubernetes/metrics-scraper              v1.0.8                          115053965e86       5 months ago       43.8MB
k8s.gcr.io/coredns                      v1.9.3                          5185b96f0bec       5 months ago       48.8MB
docker/getting-started                   latest                            cb90f98fd791       7 months ago       28.8MB
docker/desktop-vpnkit-controller         v2.0                             8c2c38aa676e       18 months ago      21MB
docker/desktop-storage-provisioner      v2.0                             99f89471f470       18 months ago      41.9MB
PS C:\Users\RISHI>
```





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



Deploy in docker application

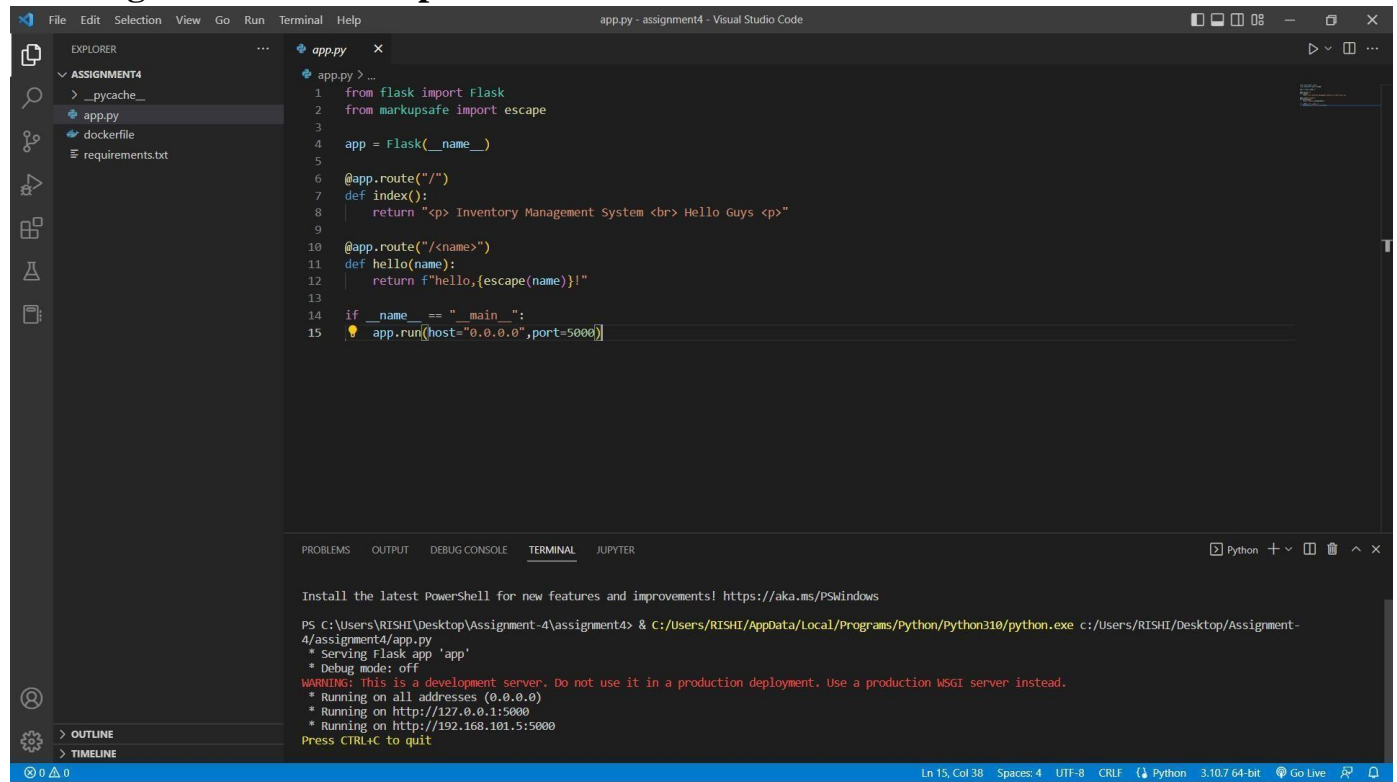
```
cmd Select Command Prompt

C:\Users\RISHI\Desktop\Assignment-4\assignment4>docker build -t docker_with_flask_inventory .
[+] Building 115.0s (10/10) FINISHED
=> [internal] load build definition from Dockerfile
=> => transferring dockerfile: 32B
=> [internal] load .dockerignore
=> => transferring context: 2B
=> [internal] load metadata for docker.io/library/python:3.10.7
=> [1/5] FROM docker.io/library/python:3.10.7@sha256:53e577204d362233ee92aeb5119449271f5eb24f99c61464efe9167ddbc8640f
=> => resolve docker.io/library/python:3.10.7@sha256:53e577204d362233ee92aeb5119449271f5eb24f99c61464efe9167ddbc8640f
=> => sha256:da84e66c3a7ca095cd8ac439270ff19b019a5e22ba7cae5ba410a8584a13b187 8.53kB / 8.53kB
=> => sha256:f606d8928ed378229f2460b94b504cca239fb906efc57acbd9340bd298d5dddf 55.05MB / 55.05MB
=> => sha256:470b015c6a547dc22ab75222193db1851cf529d2cb426f85409bf9709b08 5.10MB / 5.10MB
=> => sha256:53e577204d362233ee92aeb5119449271f5eb24f99c61464efe9167ddbc8640f 2.30kB / 2.30kB
=> => sha256:da0bcf9859b0814b180d9c8b522917b13a1ce49fc190f2a047220307fede1a5c 2.22kB / 2.22kB
=> => sha256:b4f48494000001a037672870d2a6a2536f9da8bc5d1ceddd72d79f4e7fe7a60e 10.89MB / 10.89MB
=> => sha256:a572f7a256d36a93ab0777949771b120c5d7dce75ea2a2d3d9444793b26b2ef1 54.58MB / 54.58MB
=> => sha256:8f7d0525895528fdb73153451e112bbd8e1854549bd1e0e6f4ac0b4a2ee98172 196.85MB / 196.85MB
=> => sha256:7110f04115ae2d7232ed9e59b97db7c47337c91f95edc25428baa3e522064187 6.29MB / 6.29MB
=> => sha256:cdb413c6a489499e2ee7d1f958d411ccfcc999dcccfe61de71cbb433ede76143 20.05MB / 20.05MB
=> => sha256:22311b72a3c0993d704c2f940f9eb49c4571ae931800ad975c81f4270ca00908 231B / 231B
=> => sha256:8dc0fe3806fa1182030e006f135471f3726cef064f6f90edbf100f450efad79 3.04MB / 3.04MB
=> => extracting sha256:f606d8928ed378229f2460b94b504cca239fb906efc57acbd9340bd298d5dddf
=> => extracting sha256:470b015c6a547dc22ab75222193db1851cf529d2cb426f85409bf9709b08
=> => extracting sha256:b4f48494000001a037672870d2a6a2536f9da8bc5d1ceddd72d79f4e7fe7a60e
=> => extracting sha256:a572f7a256d36a93ab0777949771b120c5d7dce75ea2a2d3d9444793b26b2ef1
=> => extracting sha256:8f7d0525895528fdb73153451e112bbd8e1854549bd1e0e6f4ac0b4a2ee98172
=> => extracting sha256:7110f04115ae2d7232ed9e59b97db7c47337c91f95edc25428baa3e522064187
=> => extracting sha256:cdb413c6a489499e2ee7d1f958d411ccfcc999dcccfe61de71cbb433ede76143
=> => extracting sha256:22311b72a3c0993d704c2f940f9eb49c4571ae931800ad975c81f4270ca00908
=> => extracting sha256:8dc0fe3806fa1182030e006f135471f3726cef064f6f90edbf100f450efad79
=> => extracting sha256:8dc0fe3806fa1182030e006f135471f3726cef064f6f90edbf100f450efad79
=> [internal] load build context
=> => transferring context: 190B
=> [2/5] WORKDIR /app
=> [3/5] COPY requirements.txt ./
=> [4/5] RUN pip install -r requirements.txt
=> [5/5] COPY . .
=> => exporting to image
=> => exporting layers
=> => writing image sha256:5d844c12d2eff9ba170fc15034f0c9c00efbed528ea42cb6a351f21377d4c6bd
=> => naming to docker.io/library/docker_with_flask_inventory

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

C:\Users\RISHI\Desktop\Assignment-4\assignment4>
```

Running in docker desktop



The screenshot shows the Visual Studio Code interface with a project named 'assignment4'. The Explorer sidebar on the left shows files: `__pycache__`, `app.py`, `dockerfile`, and `requirements.txt`. The main editor displays the `app.py` file with the following code:

```
1 from flask import Flask
2 from markupsafe import escape
3
4 app = Flask(__name__)
5
6 @app.route("/")
7 def index():
8     return "<p> Inventory Management System <br> Hello Guys <p>"
9
10 @app.route("/<name>")
11 def hello(name):
12     return f"hello,{escape(name)}!"
13
14 if __name__ == "__main__":
15     app.run(host="0.0.0.0",port=5000)
```

The bottom panel shows the TERMINAL output:

```
Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\RISHI\Desktop\Assignment-4\assignment4> & C:/Users/RISHI/AppData/Local/Programs/Python/Python310/python.exe c:/Users/RISHI/Desktop/Assignment-4/assignment4/app.py
* 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://192.168.101.5:5000
Press CTRL+C to quit
```

The status bar at the bottom indicates the file is at Line 15, Column 38, using UTF-8 encoding with CRLF line endings. The Python version is 3.10.7 64-bit.

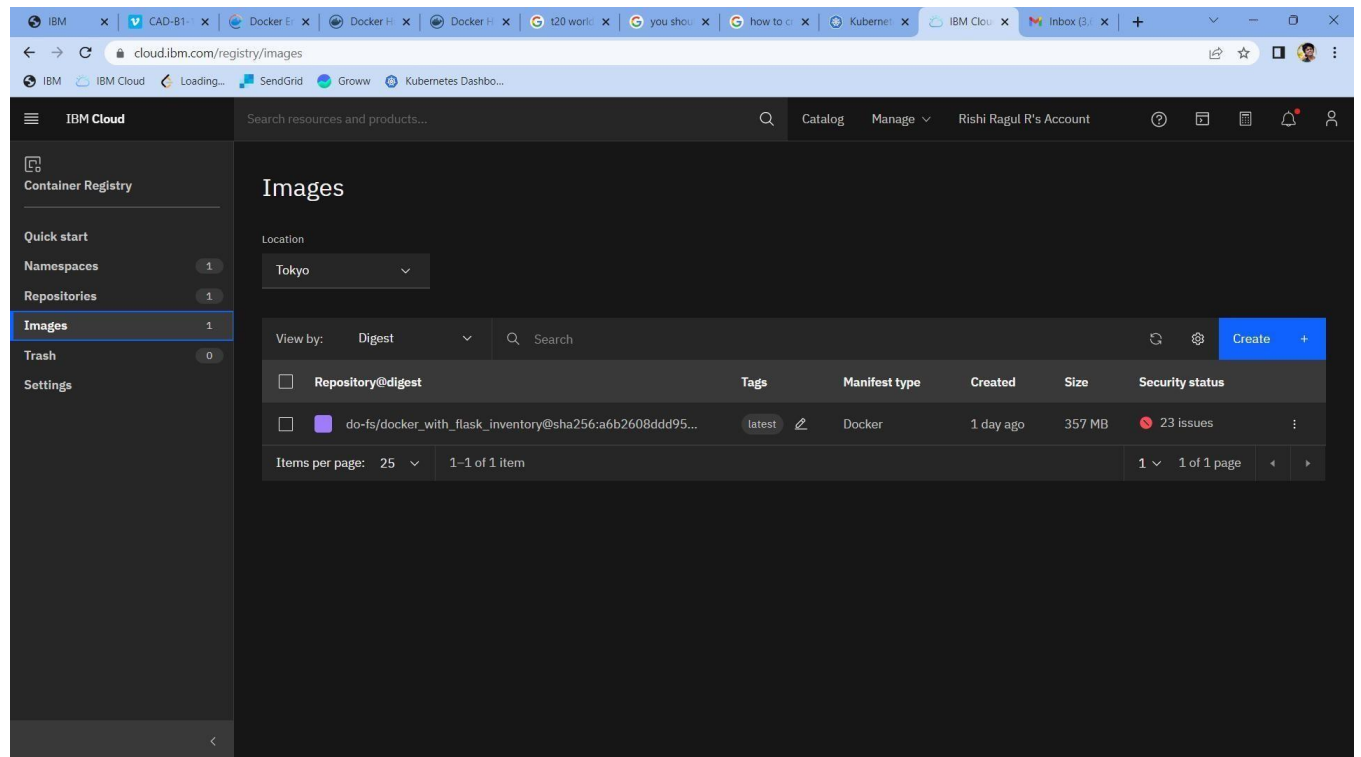
3. Create a IBM container registry and deploy hello world app or job portal app.

```
Windows PowerShell
Email: 610519104082@smartinternz.com

Password>
Authenticating...
OK

Targeted account Rishi Ragul R's Account (68a0040c508e44ffa939bddb1044d350)

API endpoint: https://cloud.ibm.com
Region: jp-tok
User: 610519104082@smartinternz.com
Account: Rishi Ragul R's Account (68a0040c508e44ffa939bddb1044d350)
Resource group: No resource group targeted, use 'C:\Program Files\IBM\Cloud\bin\ibmcloud.exe target -g RESOURCE_GROUP'
CF API endpoint:
Org:
Space:
PS C:\Users\RISHI> docker images
REPOSITORY TAG IMAGE ID CREATED SIZE
docker_with_flask_inventory latest 5d844c12d2ef 13 hours ago 933MB
rishiragulr/flask-docker latest 5d844c12d2ef 13 hours ago 933MB
jp.icr.io/do-fs/docker_with_flask_inventory latest 5d844c12d2ef 13 hours ago 933MB
hubproxy.docker.internal:5000/docker/desktop-kubernetes kubernetes-v1.25.2-cni-v1.1.1-critools-v1.24.2-cni-dockerd-v0.2.5-1-debian 09d7e1dbc2c4 6 weeks ago 363MB
k8s.gcr.io/kube-apiserver v1.25.2 97801f839490 7 weeks ago 128MB
k8s.gcr.io/kube-controller-manager v1.25.2 dbfceb93c69b 7 weeks ago 117MB
k8s.gcr.io/kube-scheduler v1.25.2 ca0ea1ee3cfd 7 weeks ago 50.6MB
k8s.gcr.io/kube-proxy v1.25.2 1c7d8c51823b 7 weeks ago 61.7MB
kubernetesui/dashboard v2.6.1 783e2b6d87ed 2 months ago 246MB
k8s.gcr.io/pause 3.0 4873874c08ef 4 months ago 711kB
k8s.gcr.io/etcd 3.5.4-0 a8a176a5d5d6 5 months ago 300MB
kubernetesui/metrics-scraper v1.0.8 115053965e86 5 months ago 43.8MB
k8s.gcr.io/coredns v1.9.3 5185b96f0bec 5 months ago 48.8MB
docker/getting-started latest cb90f98fd791 7 months ago 28.8MB
docker/desktop-vpnkit-controller v2.0 8c2c38aa676e 18 months ago 21MB
docker/desktop-storage-provisioner v2.0 99f89471f470 18 months ago 41.9MB
PS C:\Users\RISHI> docker tag docker_with_flask_inventory jp.icr.io/do-fs/docker_with_flask_inventory
PS C:\Users\RISHI> docker push jp.icr.io/do-fs/docker_with_flask_inventory
Using default tag: latest
The push refers to repository [jp.icr.io/do-fs/docker_with_flask_inventory]
d3902ba385be: Preparing
7143fba1c510: Preparing
f36426436017: Preparing
b9c0c0fe7120: Preparing
cf399be408ea: Preparing
793b971ccb99: Waiting
d172a9e6f9e6: Waiting
0c7da9a72c8: Waiting
75ba02937496: Waiting
288cf3a46a32: Waiting
186da837555d: Waiting
955c9335e041: Waiting
8e079fee2186: Waiting
```



Deploy hello world or job portal

```
Windows PowerShell
PS C:\Users\RISHI> ibmcloud cr login
Logging 'docker' in to 'jp.icr.io'...
Logged in to 'jp.icr.io'.

PS C:\Users\RISHI> docker tag docker_with_flask_inventory jp.icr.io/do-fs/docker_with_flask_inventory
PS C:\Users\RISHI> docker push jp.icr.io/do-fs/docker_with_flask_inventory:latest
The push refers to repository [jp.icr.io/do-fs/docker_with_flask_inventory]
439020a385be: Pushed
7143fba1c510: Pushed
f36426436017: Pushed
b9c0c0fe7120: Pushed
cf399be408ea: Pushed
793b971ccb99: Pushed
d172a9e6f9e6: Pushed
0c7daf9a72c8: Pushed
75ba02937496: Pushed
200cf3a46e32: Pushed
186da837555d: Pushed
955c9335e041: Pushed
8e079fee2186: Pushed
latest: digest: sha256:a6b2608ddd954c79c05fabd2ada6970000c4a8970eca1833ad685099139fc8f6 size: 3051
PS C:\Users\RISHI> docker images
REPOSITORY                                TAG                                IMAGE ID      CREATED      SIZE
docker_with_flask_inventory              latest                           5d844c12d2ef  18 hours ago  933MB
rishiragur/flask-docker                  latest                           5d844c12d2ef  18 hours ago  933MB
jp.icr.io/do-fs/docker_with_flask_inventory latest                           5d844c12d2ef  18 hours ago  933MB
jp.icr.io/do-fs/docker_with_flask_inventory latest                           5d844c12d2ef  18 hours ago  933MB
hubproxy.docker.internal:5000/docker/desktop-kubernetes kubernet... v1.25.2      09d7e1dbc2c4 6 weeks ago  363MB
k8s.gcr.io/kube-apiserver                 v1.25.2      97801f839490 7 weeks ago  128MB
k8s.gcr.io/kube-scheduler                 v1.25.2      ca8ea1ee3cfd 7 weeks ago  50.6MB
k8s.gcr.io/kube-controller-manager        v1.25.2      dbfceb93c69b 7 weeks ago  117MB
k8s.gcr.io/kube-proxy                     v1.25.2      1c7d8c51823b 7 weeks ago  61.7MB
kubernetesui/dashboard                   v2.6.1       783e2b6d87ed 2 months ago  246MB
k8s.gcr.io/pause                          3.8          4873874c08ef 4 months ago  711KB
k8s.gcr.io/etcd                           3.5.4-0      a8a176a5d5d6 5 months ago  300MB
kubernetesui/metrics-scraper              v1.0.8       115053965e86 5 months ago  43.8MB
k8s.gcr.io/coredns                       v1.9.3       5185b06f0bec 5 months ago  48.8MB
docker/getting-started                     latest       cb90f08fd701 7 months ago  28.8MB
docker/desktop-vpnkit-controller           v2.0         8c2c38aa676e 18 months ago  21MB
docker/desktop-storage-provisioner         v2.0         99f89471f470 18 months ago  41.9MB
PS C:\Users\RISHI>
```

4. Create a Kubernetes cluster in IBM cloud and deploy hello world image or job portal image and also expose the same app to run in node port.

Creating a Kubernetes cluster in IBM cloud

The screenshot shows the IBM Cloud Kubernetes dashboard. The top navigation bar includes the IBM Cloud logo, a search bar, and links to Catalog, Manage, and the user's account (Rishi Ragul R's Account). The main header displays the cluster name 'mycluster-free' with a green status icon, a 'Normal' label, and a red 'Expires in 29 days' warning. There are buttons for 'Help', 'Kubernetes dashboard', and 'Actions...'. The left sidebar contains links for 'Overview', 'Worker nodes' (which is highlighted), 'Worker pools', and 'DevOps' with a 'New' button. The main content area shows a table of worker nodes. The table has columns for Name, Status, Worker pool, Zone, Private IP, Public IP, and Version. A single node is listed with ID '0000007d', status 'Normal', worker pool 'default', zone 'Milan 01', private IP '10.144.214.101', public IP '169.51.205.202', and version '1.24.7_1543'. At the bottom of the table, it indicates 'Items per page: 25' and '1-1 of 1 item'.

Name	Status	Worker pool	Zone	Private IP	Public IP	Version
0000007d	Normal	default	Milan 01	10.144.214.101	169.51.205.202	1.24.7_1543

Expose the same app to run in notepoint

```
Command Prompt
C:\Users\RISHI>cd C:\Users\RISHI\Desktop\Assignment-4\assignment4

C:\Users\RISHI\Desktop\Assignment-4\assignment4>kubectl apply -f kubernetes/deployment.yaml
error: the path "kubernetes/deployment.yaml" does not exist

C:\Users\RISHI\Desktop\Assignment-4\assignment4>ibmcloud ks cluster config --cluster cd1tlpof0uv2a9hfiubg
OK
The configuration for cd1tlpof0uv2a9hfiubg was downloaded successfully.

Added context for cd1tlpof0uv2a9hfiubg to the current kubeconfig file.
You can now execute 'kubectl' commands against your cluster. For example, run 'kubectl get nodes'.
If you are accessing the cluster for the first time, 'kubectl' commands might fail for a few seconds while RBAC synchronizes.

C:\Users\RISHI\Desktop\Assignment-4\assignment4>kubectl apply -f kubernetes/flask_deployment.yaml
error: the path "kubernetes/flask_deployment.yaml" does not exist

C:\Users\RISHI\Desktop\Assignment-4\assignment4>kubectl apply -f kubernetes/flask_deployment.yaml
deployment.apps/flask-app created

C:\Users\RISHI\Desktop\Assignment-4\assignment4>kubectl_
```

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eu-de.containers.cloud.ibm.com/kubeproxy/clusters/cdltpof0uv2a9hfiubg/service/#/workloads?namespace=default

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IBM Cloud

Loading...

SendGrid

Groww

Kubernetes Dashbo...

Docker Hub

kubernetes

default

Search

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🔔

👤

Workloads

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

Workload Status

Failed: 1

Deployments

Failed: 5

Pods

Failed: 1

Replica Sets

Deployments

Name	Images	Labels	Pods	Created ↑
<div>flask-app</div>	Show all	-	0 / 5	4 minutes ago

Pods

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eu-de.containers.cloud.ibm.com/kubeproxy/clusters/cdltpof0uv2a9hfiubg/service/#/pod?namespace=default

IBM

IBM Cloud

Loading...

SendGrid

Groww

Kubernetes Dashbo...

Docker Hub

kubernetes

default

Search

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🔔

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Workloads > Pods

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

Pods

Name	Images	Labels	Node	Status	Restarts	CPU Usage (cores)	Memory Usage (bytes)	Created ↑
<div>flask-app-5c85fdb465-fqx8b</div>	Show all	Show all	10.144.214.101	ErrImageNev 0	-	-	-	5 minutes ago
<div>flask-app-5c85fdb465-gvv9x</div>	Show all	Show all	10.144.214.101	ErrImageNev 0	-	-	-	5 minutes ago
<div>flask-app-5c85fdb465-wmrb6</div>	Show all	Show all	10.144.214.101	ErrImageNev 0	-	-	-	5 minutes ago
<div>flask-app-5c85fdb465-xqf5h</div>	Show all	Show all	10.144.214.101	ErrImageNev 0	-	-	-	5 minutes ago
<div>flask-app-5c85fdb465-zqpb9</div>	Show all	Show all	10.144.214.101	ErrImageNev 0	-	-	-	5 minutes ago