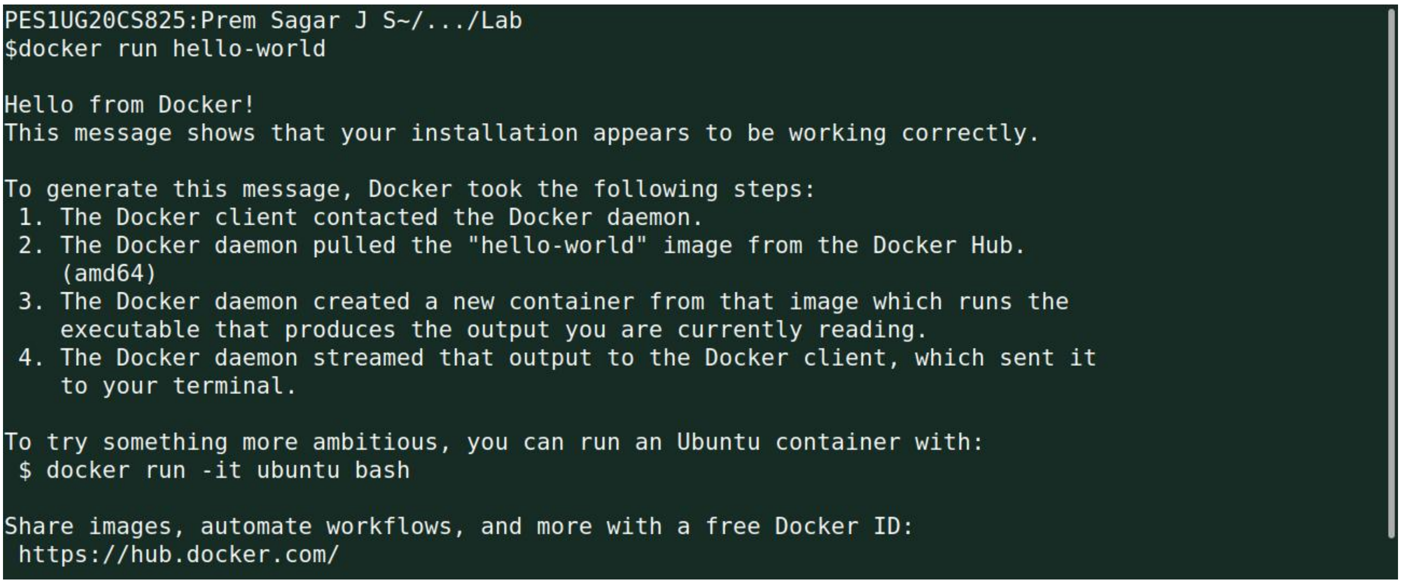
CLOUD COMPUTING - UE20CS351

SRN : PES1UG20CS825	NAME : PREM SAGAR J S	SEC : ‘H’

Experiment 2 - Docker on Linux/Windows/Mac OS

Task 1: Installing Docker Engine

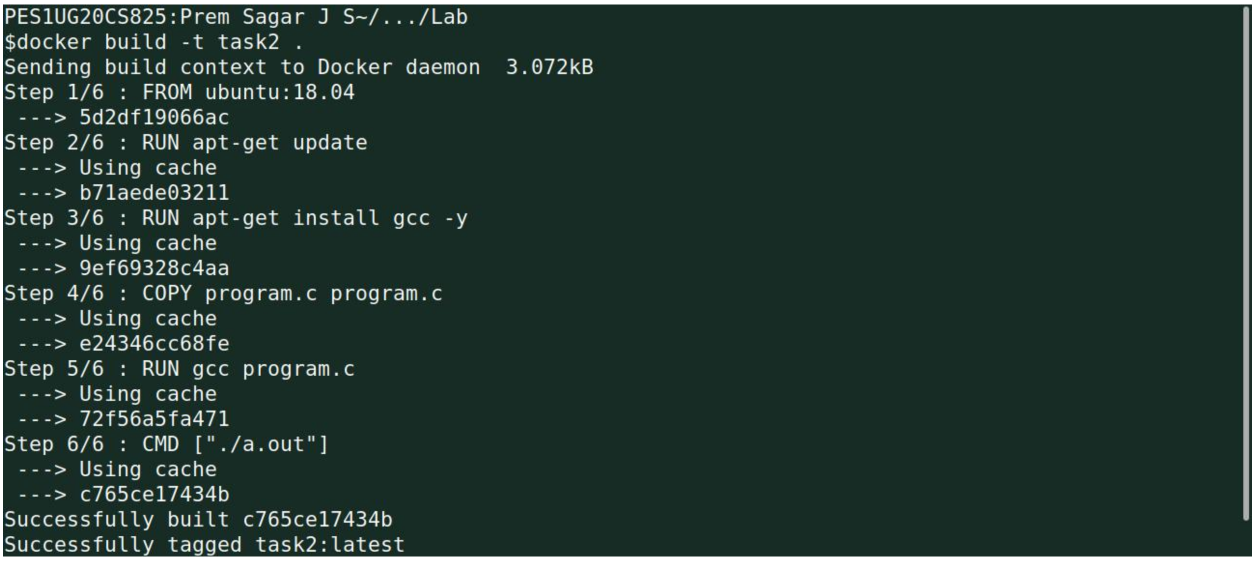
- 1a. jpg: Screenshot of running docker hello-world.



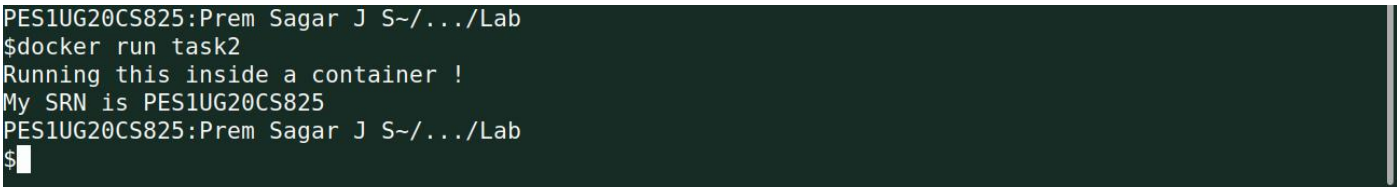
```
PES1UG20CS825:Prem Sagar J S~/.../Lab
$docker run hello-world

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/
```

Task 2: Docker images and docker files

- 2a. jpg: Screenshot of C Program successfully run inside the container.

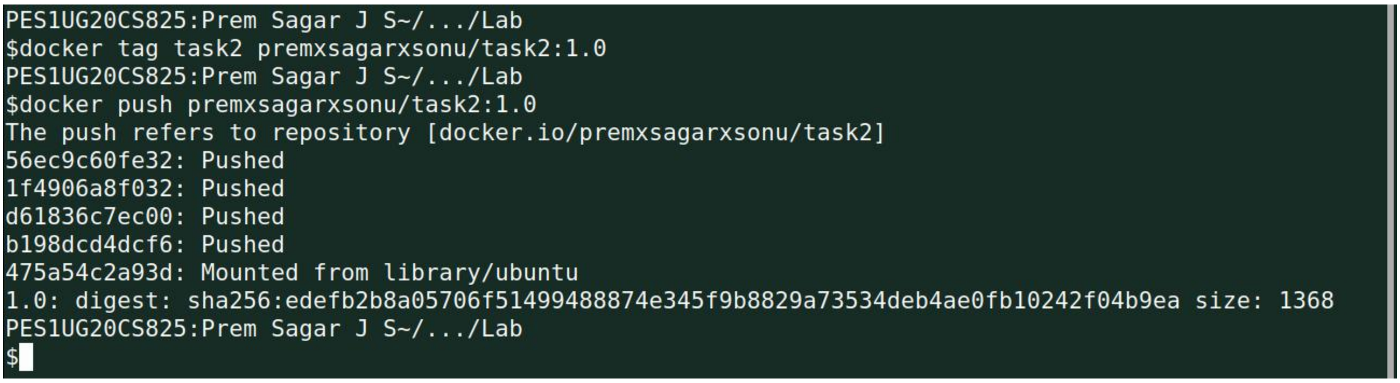


```
PES1UG20CS825:Prem Sagar J S~/.../Lab
$docker build -t task2 .
Sending build context to Docker daemon  3.072kB
Step 1/6 : FROM ubuntu:18.04
 ---> 5d2df19066ac
Step 2/6 : RUN apt-get update
 ---> Using cache
 ---> b71aede03211
Step 3/6 : RUN apt-get install gcc -y
 ---> Using cache
 ---> 9ef69328c4aa
Step 4/6 : COPY program.c program.c
 ---> Using cache
 ---> e24346cc68fe
Step 5/6 : RUN gcc program.c
 ---> Using cache
 ---> 72f56a5fa471
Step 6/6 : CMD ["./a.out"]
 ---> Using cache
 ---> c765ce17434b
Successfully built c765ce17434b
Successfully tagged task2:latest
```



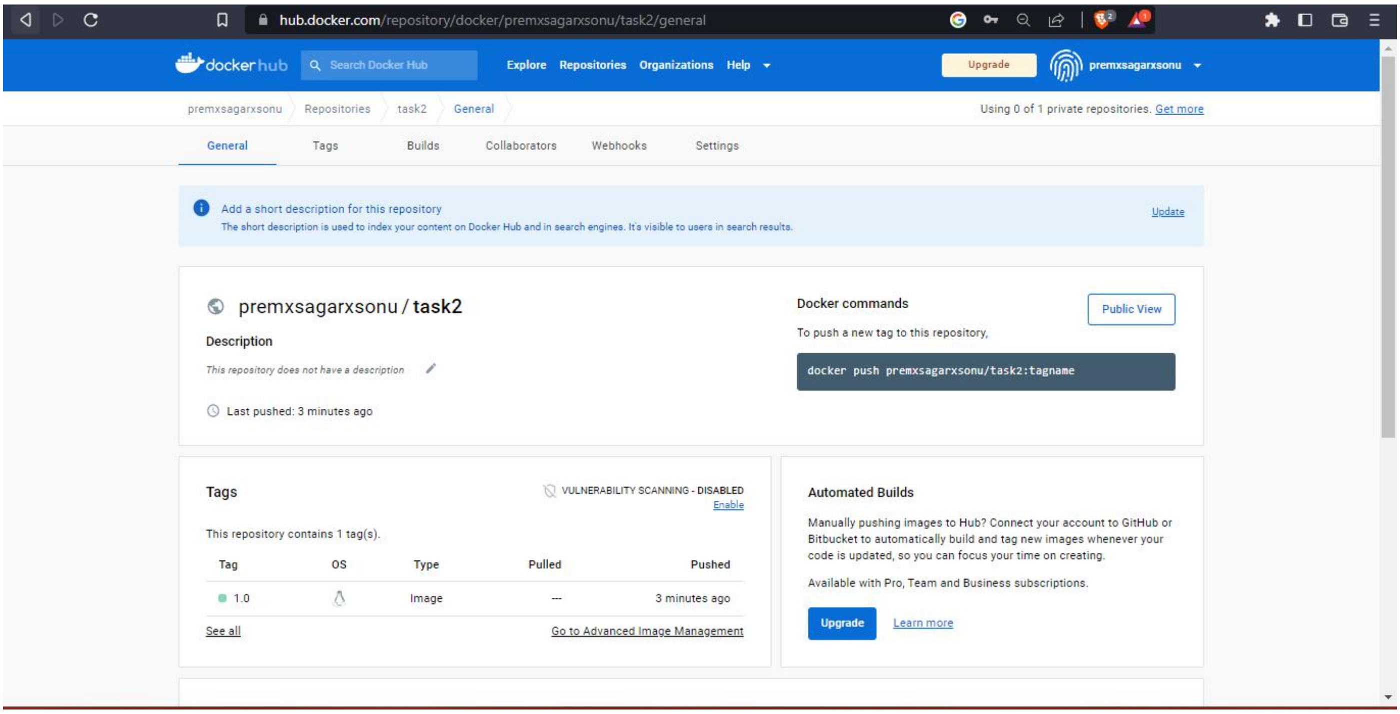
```
PES1UG20CS825:Prem Sagar J S~/.../Lab
$docker run task2
Running this inside a container !
My SRN is PES1UG20CS825
PES1UG20CS825:Prem Sagar J S~/.../Lab
$
```

- 2b. jpg: Screenshot of the image pushed to Dockerhub.



```
PES1UG20CS825:Prem Sagar J S~/.../Lab
$docker tag task2 premxsagarxsonu/task2:1.0
PES1UG20CS825:Prem Sagar J S~/.../Lab
$docker push premxsagarxsonu/task2:1.0
The push refers to repository [docker.io/premxsagarxsonu/task2]
56ec9c60fe32: Pushed
1f4906a8f032: Pushed
d61836c7ec00: Pushed
b198dcd4dcf6: Pushed
475a54c2a93d: Mounted from library/ubuntu
1.0: digest: sha256:edefb2b8a05706f51499488874e345f9b8829a73534deb4ae0fb10242f04b9ea size: 1368
PES1UG20CS825:Prem Sagar J S~/.../Lab
$
```

- Docker Hub



Using 0 of 1 private repositories. Get more

Add a short description for this repository

The short description is used to index your content on Docker Hub and in search engines. It's visible to users in search results.

premxsagarxsonu / task2

Description

This repository does not have a description

Last pushed: 3 minutes ago

Docker commands

To push a new tag to this repository,

```
docker push premxsagarxsonu/task2:tagname
```

Tags

VULNERABILITY SCANNING - DISABLED

This repository contains 1 tag(s).

Tag	OS	Type	Pulled	Pushed
1.0		Image	---	3 minutes ago

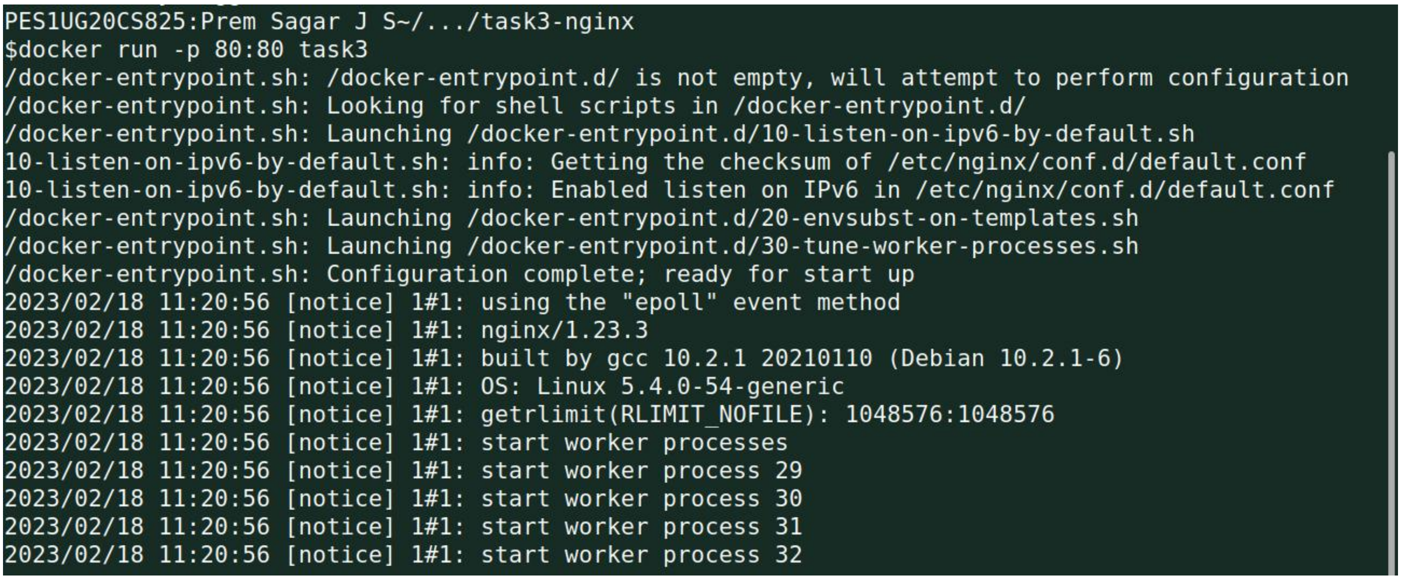
Automated Builds

Manually pushing images to Hub? Connect your account to GitHub or Bitbucket to automatically build and tag new images whenever your code is updated, so you can focus your time on creating.

Available with Pro, Team and Business subscriptions.

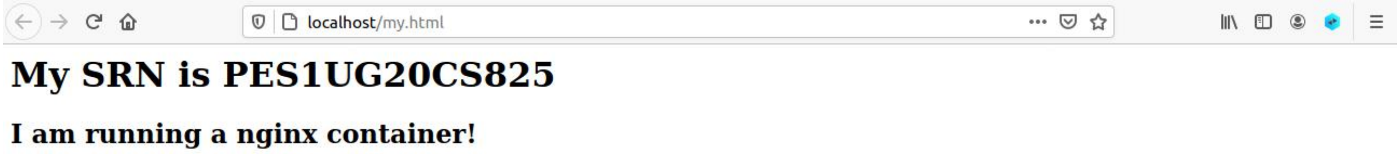
Task 3: Exposing ports,docker networks

- 3a.jpg: Screenshot of docker container running nginx



```
PES1UG20CS825:Prem Sagar J S~/.../task3-nginx
$docker run -p 80:80 task3
/docker-entrypoint.sh: /docker-entrypoint.d/ is not empty, will attempt to perform configuration
/docker-entrypoint.sh: Looking for shell scripts in /docker-entrypoint.d/
/docker-entrypoint.sh: Launching /docker-entrypoint.d/10-listen-on-ipv6-by-default.sh
10-listen-on-ipv6-by-default.sh: info: Getting the checksum of /etc/nginx/conf.d/default.conf
10-listen-on-ipv6-by-default.sh: info: Enabled listen on IPv6 in /etc/nginx/conf.d/default.conf
/docker-entrypoint.sh: Launching /docker-entrypoint.d/20-envsubst-on-templates.sh
/docker-entrypoint.sh: Launching /docker-entrypoint.d/30-tune-worker-processes.sh
/docker-entrypoint.sh: Configuration complete; ready for start up
2023/02/18 11:20:56 [notice] 1#1: using the "epoll" event method
2023/02/18 11:20:56 [notice] 1#1: nginx/1.23.3
2023/02/18 11:20:56 [notice] 1#1: built by gcc 10.2.1 20210110 (Debian 10.2.1-6)
2023/02/18 11:20:56 [notice] 1#1: OS: Linux 5.4.0-54-generic
2023/02/18 11:20:56 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1048576:1048576
2023/02/18 11:20:56 [notice] 1#1: start worker processes
2023/02/18 11:20:56 [notice] 1#1: start worker process 29
2023/02/18 11:20:56 [notice] 1#1: start worker process 30
2023/02/18 11:20:56 [notice] 1#1: start worker process 31
2023/02/18 11:20:56 [notice] 1#1: start worker process 32
```

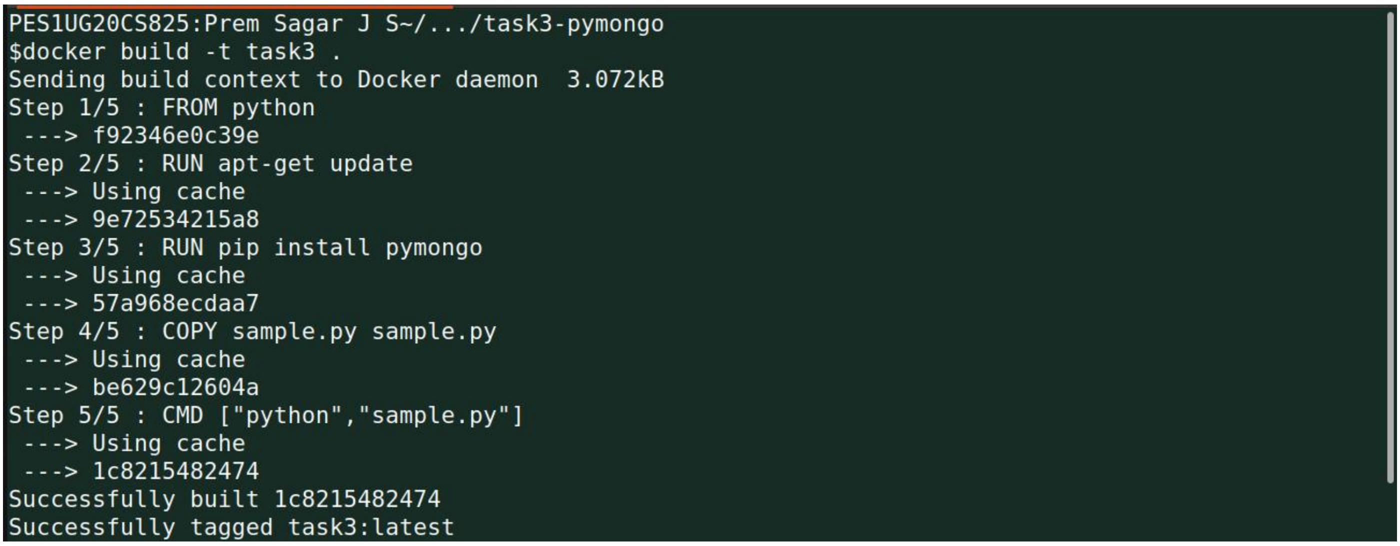
- 3b.jpg: Sample.html showing the web page on the browser.



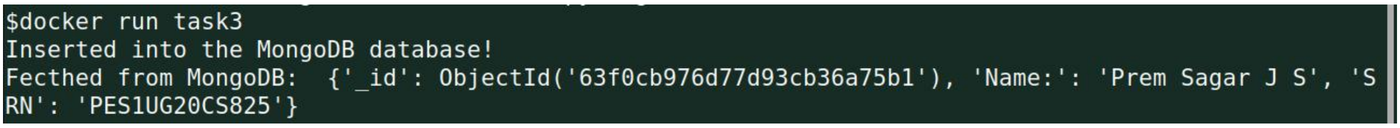
My SRN is PES1UG20CS825

I am running a nginx container!

- 3c.jpg: Screenshot of python application successfully writing and reading from the MongoDB database

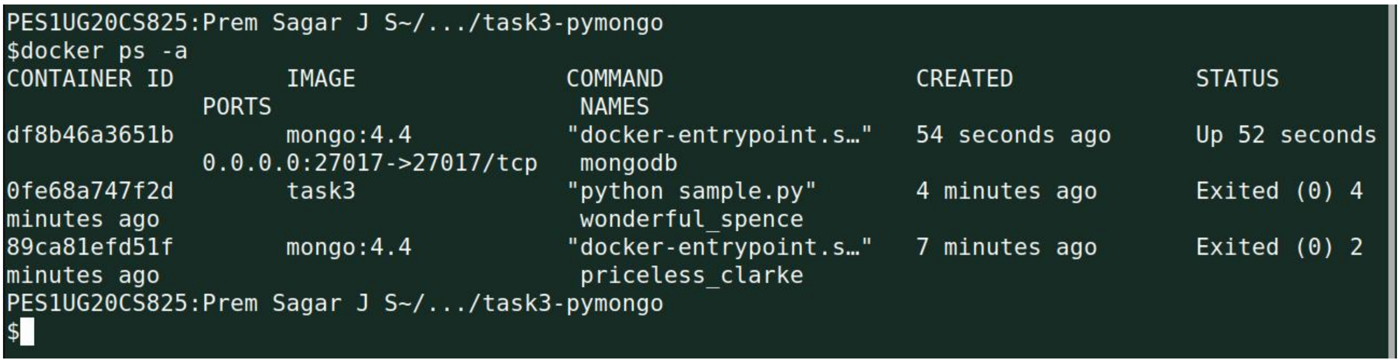


```
PES1UG20CS825:Prem Sagar J S~/.../task3-pymongo
$docker build -t task3 .
Sending build context to Docker daemon  3.072kB
Step 1/5 : FROM python
 ---> f92346e0c39e
Step 2/5 : RUN apt-get update
 ---> Using cache
 ---> 9e72534215a8
Step 3/5 : RUN pip install pymongo
 ---> Using cache
 ---> 57a968ecdaa7
Step 4/5 : COPY sample.py sample.py
 ---> Using cache
 ---> be629c12604a
Step 5/5 : CMD ["python","sample.py"]
 ---> Using cache
 ---> 1c8215482474
Successfully built 1c8215482474
Successfully tagged task3:latest
```



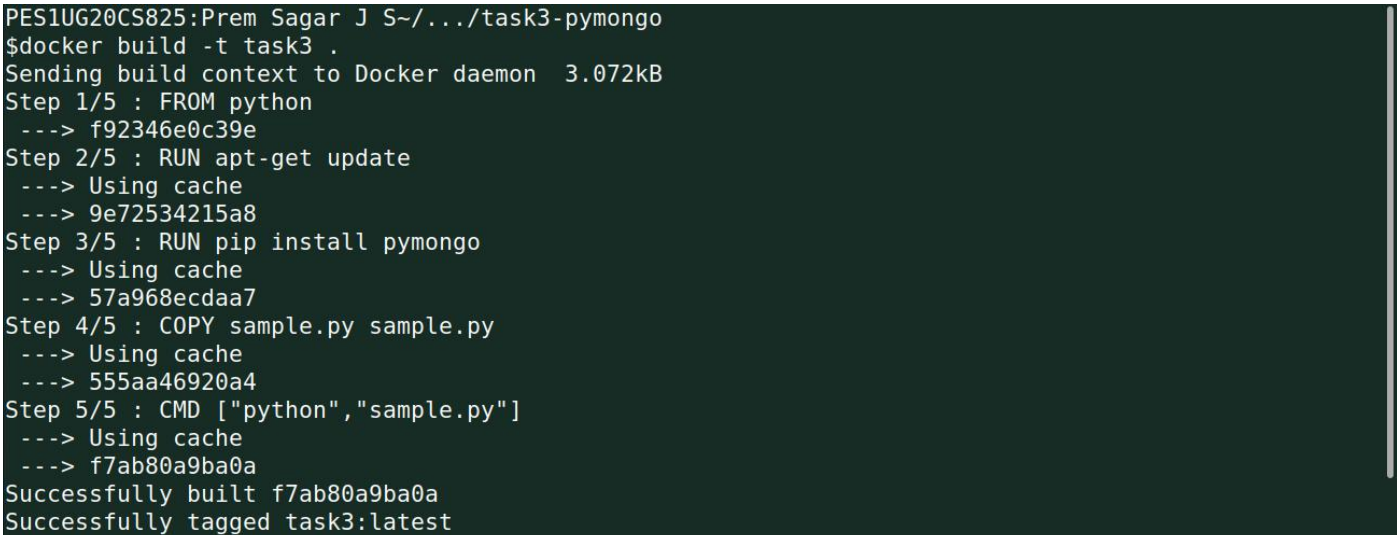
```
$docker run task3
Inserted into the MongoDB database!
Fecthed from MongoDB:  {'_id': ObjectId('63f0cb976d77d93cb36a75b1'), 'Name:': 'Prem Sagar J S', 'S
RN': 'PES1UG20CS825'}
```

- 3d.jpg: Screenshot showing mongodb being run within the network(docker command has to be clearly highlighted)

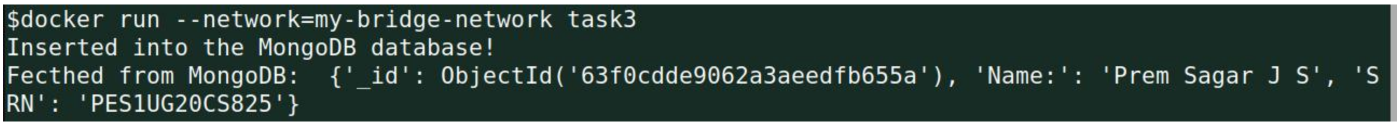


```
PES1UG20CS825:Prem Sagar J S~/.../task3-pymongo
$docker ps -a
CONTAINER ID        IMAGE               COMMAND                  CREATED             STATUS
              PORTS                      NAMES
df8b46a3651b        mongo:4.4           "docker-entrypoint.s…"   54 seconds ago      Up 52 seconds
              0.0.0.0:27017->27017/tcp   mongodb
0fe68a747f2d        task3               "python sample.py"       4 minutes ago       Exited (0) 4
minutes ago                              wonderful_spence
89ca81efd51f        mongo:4.4           "docker-entrypoint.s…"   7 minutes ago       Exited (0) 2
minutes ago                              priceless_clarke
PES1UG20CS825:Prem Sagar J S~/.../task3-pymongo
$
```

- 3e.jpg: Screenshot showing python file being run within the network and successfully writing and reading from MongoDB(docker command has to be clearly highlighted)



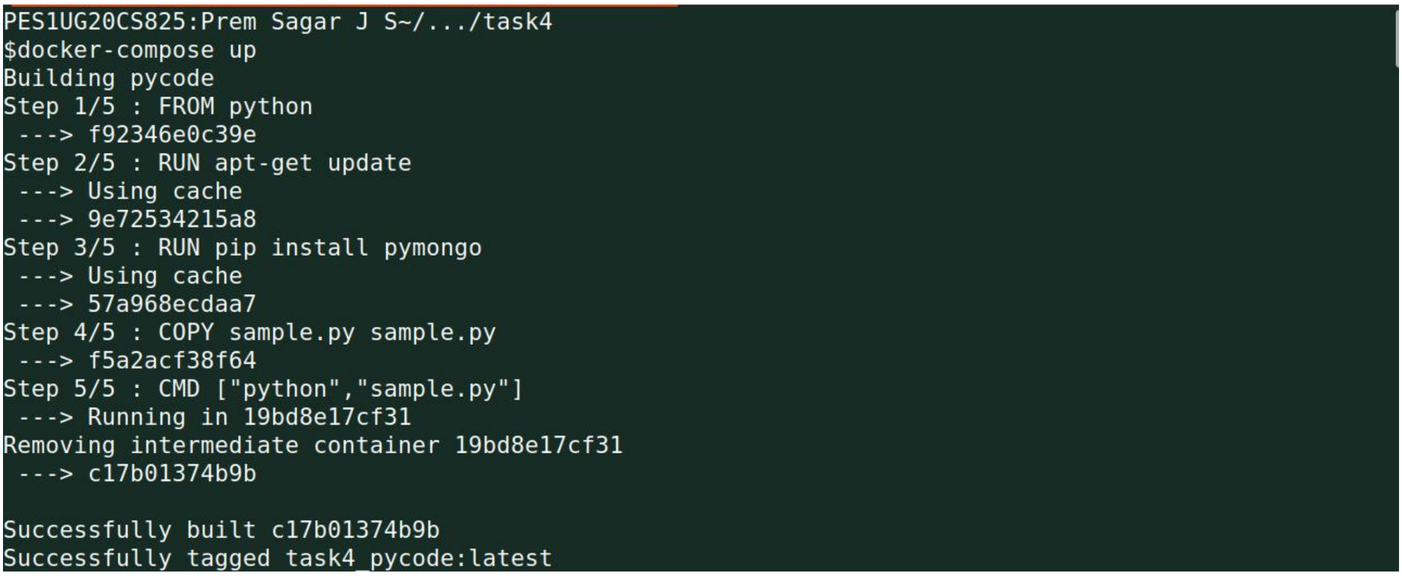
```
PES1UG20CS825:Prem Sagar J S~/.../task3-pymongo
$docker build -t task3 .
Sending build context to Docker daemon  3.072kB
Step 1/5 : FROM python
 ---> f92346e0c39e
Step 2/5 : RUN apt-get update
 ---> Using cache
 ---> 9e72534215a8
Step 3/5 : RUN pip install pymongo
 ---> Using cache
 ---> 57a968ecdaa7
Step 4/5 : COPY sample.py sample.py
 ---> Using cache
 ---> 555aa46920a4
Step 5/5 : CMD ["python","sample.py"]
 ---> Using cache
 ---> f7ab80a9ba0a
Successfully built f7ab80a9ba0a
Successfully tagged task3:latest
```



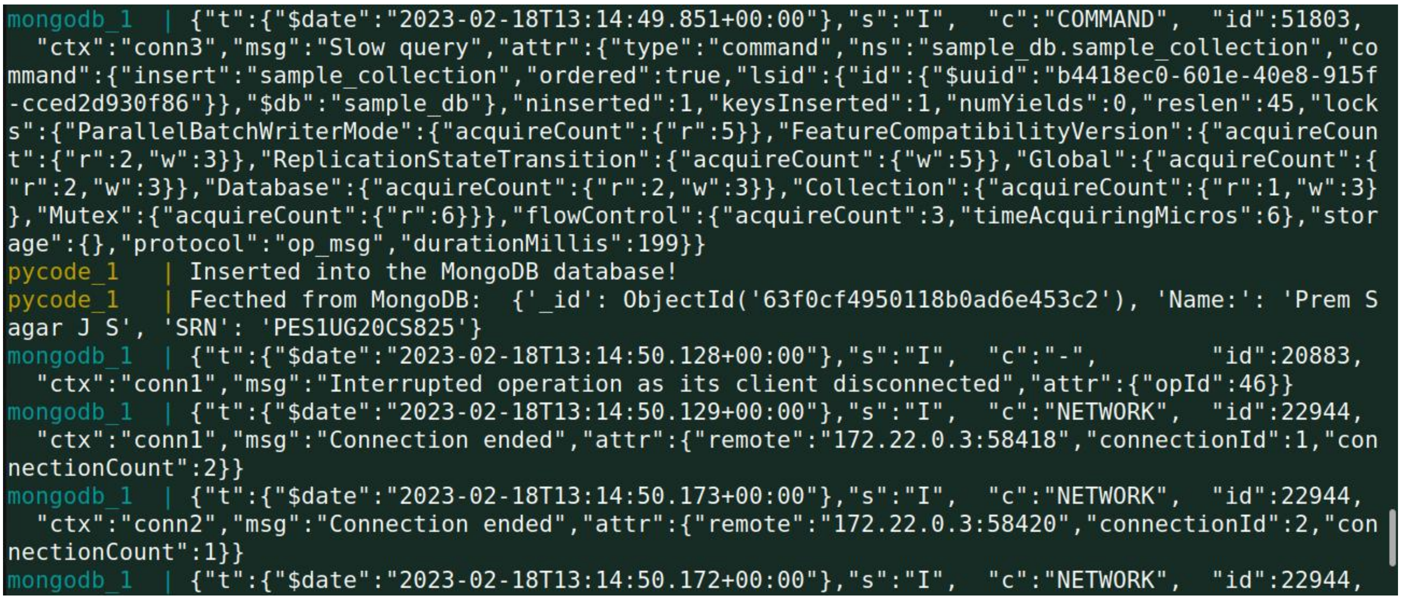
```
$docker run --network=my-bridge-network task3
Inserted into the MongoDB database!
Fecthed from MongoDB:  {'_id': ObjectId('63f0cdde9062a3aeedfb655a'), 'Name:': 'Prem Sagar J S', 'S
RN': 'PES1UG20CS825'}
```

Task 4: Docker compose

- 4a.jpg: Screenshot of python-mongodb application running as a docker-compose application(logs of the application)

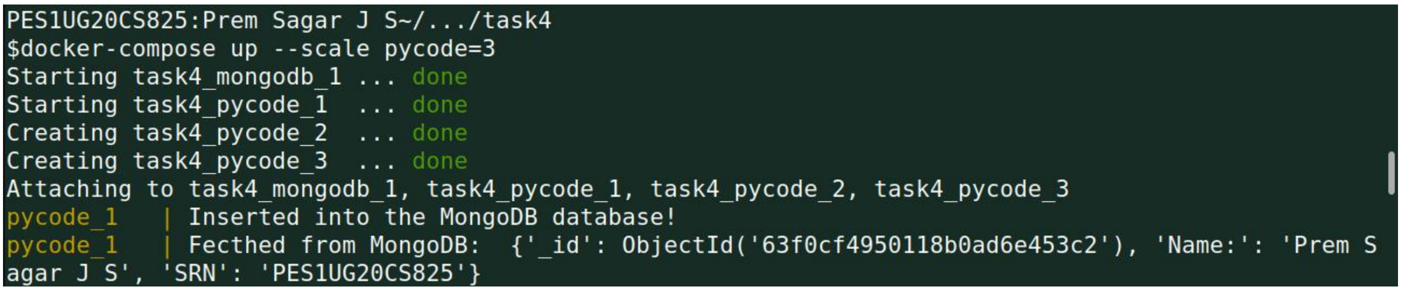


```
PES1UG20CS825:Prem Sagar J S~/.../task4
$docker-compose up
Building pycode
Step 1/5 : FROM python
 ---> f92346e0c39e
Step 2/5 : RUN apt-get update
 ---> Using cache
 ---> 9e72534215a8
Step 3/5 : RUN pip install pymongo
 ---> Using cache
 ---> 57a968ecdaa7
Step 4/5 : COPY sample.py sample.py
 ---> f5a2acf38f64
Step 5/5 : CMD ["python","sample.py"]
 ---> Running in 19bd8e17cf31
Removing intermediate container 19bd8e17cf31
 ---> c17b01374b9b

Successfully built c17b01374b9b
Successfully tagged task4_pycode:latest
```

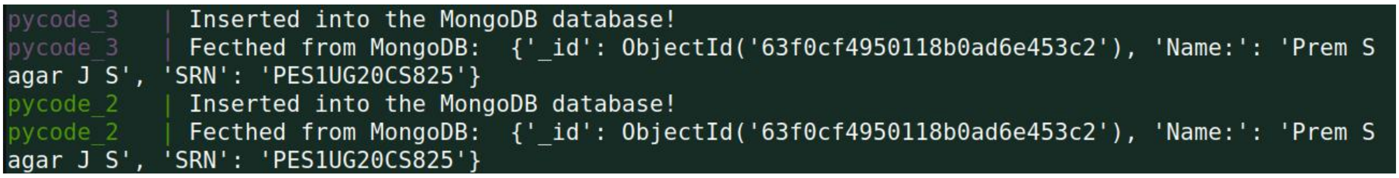


```
mongodb_1  | {"t":{"$date":"2023-02-18T13:14:49.851+00:00"},"s":"I",  "c":"COMMAND",  "id":51803,
  "ctx":"conn3","msg":"Slow query","attr":{"type":"command","ns":"sample_db.sample_collection","co
mmand":{"insert":"sample_collection","ordered":true,"lsid":{"id":{"$uuid":"b4418ec0-601e-40e8-915f
-cced2d930f86"}},"$db":"sample_db"},"ninserted":1,"keysInserted":1,"numYields":0,"reslen":45,"lock
s":{"ParallelBatchWriterMode":{"acquireCount":{"r":5}},"FeatureCompatibilityVersion":{"acquireCoun
t":{"r":2,"w":3}},"ReplicationStateTransition":{"acquireCount":{"w":5}},"Global":{"acquireCount":{
"r":2,"w":3}},"Database":{"acquireCount":{"r":2,"w":3}},"Collection":{"acquireCount":{"r":1,"w":3}
},"Mutex":{"acquireCount":{"r":6}}},"flowControl":{"acquireCount":3,"timeAcquiringMicros":6},"stor
age":{},"protocol":"op_msg","durationMillis":199}}
pycode_1   | Inserted into the MongoDB database!
pycode_1   | Fecthed from MongoDB:  {'_id': ObjectId('63f0cf4950118b0ad6e453c2'), 'Name:': 'Prem S
agar J S', 'SRN': 'PES1UG20CS825'}
mongodb_1  | {"t":{"$date":"2023-02-18T13:14:50.128+00:00"},"s":"I",  "c":"-",        "id":20883,
  "ctx":"conn1","msg":"Interrupted operation as its client disconnected","attr":{"opId":46}}
mongodb_1  | {"t":{"$date":"2023-02-18T13:14:50.129+00:00"},"s":"I",  "c":"NETWORK",  "id":22944,
  "ctx":"conn1","msg":"Connection ended","attr":{"remote":"172.22.0.3:58418","connectionId":1,"con
nectionCount":2}}
mongodb_1  | {"t":{"$date":"2023-02-18T13:14:50.173+00:00"},"s":"I",  "c":"NETWORK",  "id":22944,
  "ctx":"conn2","msg":"Connection ended","attr":{"remote":"172.22.0.3:58420","connectionId":2,"con
nectionCount":1}}
mongodb_1  | {"t":{"$date":"2023-02-18T13:14:50.172+00:00"},"s":"I",  "c":"NETWORK",  "id":22944,
```

- 4b.jpg: Screenshot of 3 python application writes and reads from MongoDB after scaling the python application.



```
PES1UG20CS825:Prem Sagar J S~/.../task4
$docker-compose up --scale pycode=3
Starting task4_mongodb_1 ... done
Starting task4_pycode_1  ... done
Creating task4_pycode_2  ... done
Creating task4_pycode_3  ... done
Attaching to task4_mongodb_1, task4_pycode_1, task4_pycode_2, task4_pycode_3
pycode_1   | Inserted into the MongoDB database!
pycode_1   | Fecthed from MongoDB:  {'_id': ObjectId('63f0cf4950118b0ad6e453c2'), 'Name:': 'Prem S
agar J S', 'SRN': 'PES1UG20CS825'}
```



```
pycode_3    | Inserted into the MongoDB database!
pycode_3    | Fecthed from MongoDB:  {'_id': ObjectId('63f0cf4950118b0ad6e453c2'), 'Name:': 'Prem S
agar J S', 'SRN': 'PES1UG20CS825'}
pycode_2    | Inserted into the MongoDB database!
pycode_2    | Fecthed from MongoDB:  {'_id': ObjectId('63f0cf4950118b0ad6e453c2'), 'Name:': 'Prem S
agar J S', 'SRN': 'PES1UG20CS825'}
```

--------------------------*************----------------------------