

# CLOUD COMPUTING – UE20CS351 LAB

## Experiment 2 - Docker on Linux/Windows/Mac OS

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

```
C:\Users\Sahana Rao>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/


For more examples and ideas, visit:
https://docs.docker.com/get-started/

C:\Users\Sahana Rao>
```

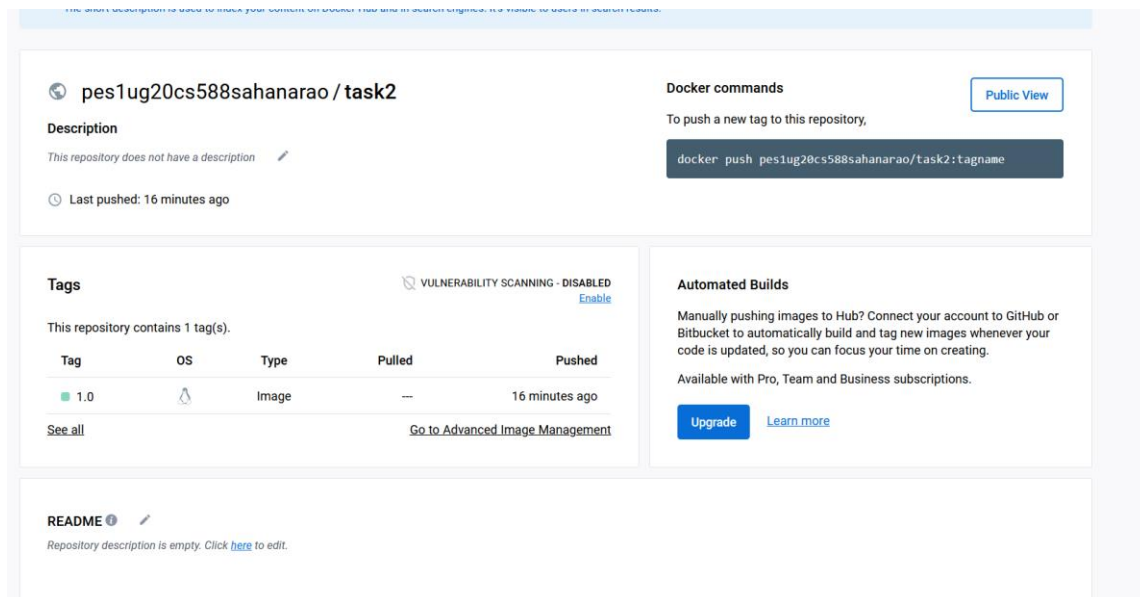
- 2a.jpg: Screenshot of C Program successfully run inside the container.

```
C:\Users\Sahana Rao>docker run task2
Running this inside a container !
My SRN is PES1UG20CS588

C:\Users\Sahana Rao>
```



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



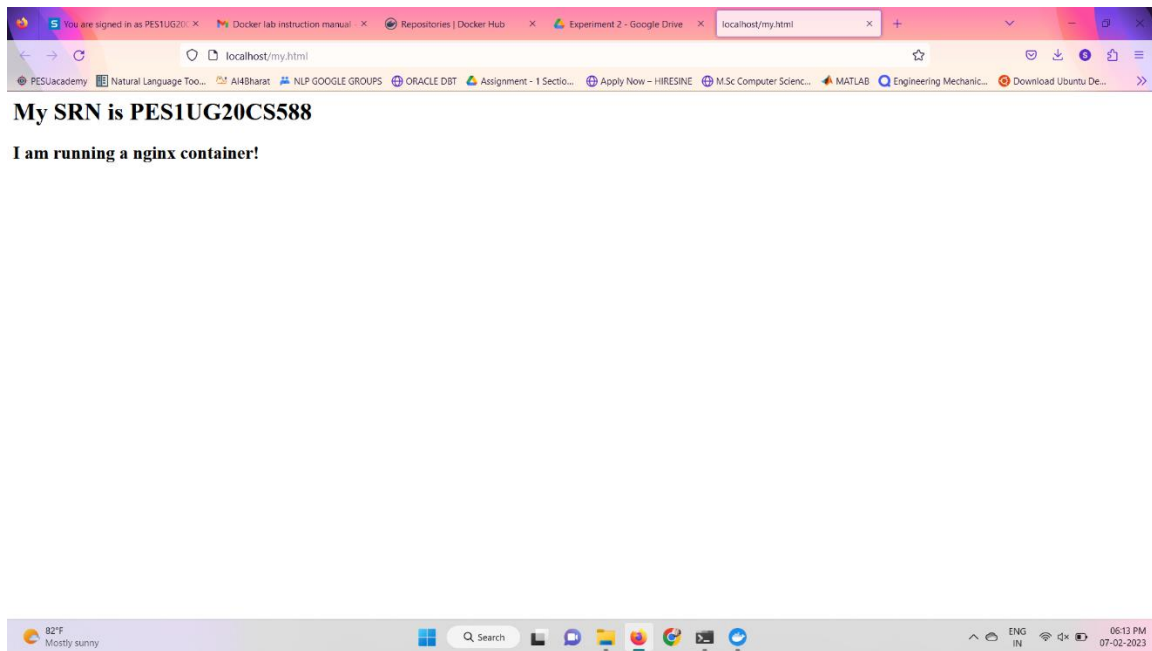
### ● 3a.jpg: Screenshot of docker container running nginx

```
C:\Windows\System32\cmd.exe x + v
=> naming to docker.io/library/task3 0.0s

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

C:\Users\Sahana Rao\Desktop\PES1UG20CS588\SEM6\CC\LAB2\task3\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
2023/02/07 12:43:10 [notice] 1#1: using the "epoll" event method
2023/02/07 12:43:10 [notice] 1#1: nginx/1.23.3
2023/02/07 12:43:10 [notice] 1#1: built by gcc 10.2.1 20210110 (Debian 10.2.1-6)
2023/02/07 12:43:10 [notice] 1#1: OS: Linux 5.15.79.1-microsoft-standard-WSL2
2023/02/07 12:43:10 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1048576:1048576
2023/02/07 12:43:10 [notice] 1#1: start worker processes
2023/02/07 12:43:10 [notice] 1#1: start worker process 29
2023/02/07 12:43:10 [notice] 1#1: start worker process 30
2023/02/07 12:43:10 [notice] 1#1: start worker process 31
2023/02/07 12:43:10 [notice] 1#1: start worker process 32
2023/02/07 12:43:10 [notice] 1#1: start worker process 33
2023/02/07 12:43:10 [notice] 1#1: start worker process 34
2023/02/07 12:43:10 [notice] 1#1: start worker process 35
2023/02/07 12:43:10 [notice] 1#1: start worker process 36
2023/02/07 12:43:10 [notice] 1#1: start worker process 37
2023/02/07 12:43:10 [notice] 1#1: start worker process 38
2023/02/07 12:43:10 [notice] 1#1: start worker process 39
2023/02/07 12:43:10 [notice] 1#1: start worker process 40
172.17.0.1 - - [07/Feb/2023:12:43:16 +0000] "GET /my.html HTTP/1.1" 200 114 "-" "Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:109.0) Gecko/20100101 Firefox/109.0" "-"
2023/02/07 12:43:16 [error] 29#29: *1 open() "/usr/share/nginx/html/favicon.ico" failed (2: No such file or directory), client: 172.17.0.1, server: localhost, request: "GET /favicon.ico HTTP/1.1", host: "localhost", referer: "http://localhost/my.html"
172.17.0.1 - - [07/Feb/2023:12:43:16 +0000] "GET /favicon.ico HTTP/1.1" 404 153 "http://localhost/my.html" "Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:109.0) Gecko/20100101 Firefox/109.0" "-"
```

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



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

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

C:\Users\Sahana Rao\Desktop\PES1UG20CS588\SEM6\CC\LAB2\task3\task3-pymongo>docker run task3
Inserted into the MongoDB database!
Fetched from MongoDB: {'_id': ObjectId('63e2498f6d249520073037f0'), 'Name': 'SAHANA RAO', 'SRN': 'PES1UG20CS588'}

C:\Users\Sahana Rao\Desktop\PES1UG20CS588\SEM6\CC\LAB2\task3\task3-pymongo>
```

- 3d.jpg: Screenshot showing mongoddb being run within the network

```
C:\Users\Sahana Rao\Desktop\PES1UG20CS588\SEM6\CC\LAB2\task3\task3-pymongo>docker ps -a
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
1f2d338181e	mongo:latest	"docker-entrypoint.s..."	15 seconds ago	Up 14 seconds	0.0.0.0:27017->27017/tcp	mongod
2857289c8d51	task3	"python sample.py"	2 minutes ago	Exited (0) 2 minutes ago		angry_clarke
1a702f1cca92	mongo	"docker-entrypoint.s..."	7 minutes ago	Exited (0) About a minute ago		jovial_cohen
4e57f7f271b8	11ea2e1ce0b6	"/docker-entrypoint..."	11 minutes ago	Exited (0) 9 minutes ago		epic_ritchie
26464636d694	11ea2e1ce0b6	"/docker-entrypoint..."	27 minutes ago	Exited (0) 20 minutes ago		nervous_roentgen
01679a4ff6d4	task2	"/a.out"	About an hour ago	Exited (0) About an hour ago		heuristic_chatelet
490d3f252000	hello-world	"/hello"	4 hours ago	Exited (0) 4 hours ago		laughing_knuth

```
C:\Users\Sahana Rao\Desktop\PES1UG20CS588\SEM6\CC\LAB2\task3\task3-pymongo>
```

- 3e.jpg: Screenshot showing python file being run within the network and successfully writing and reading from MongoDB

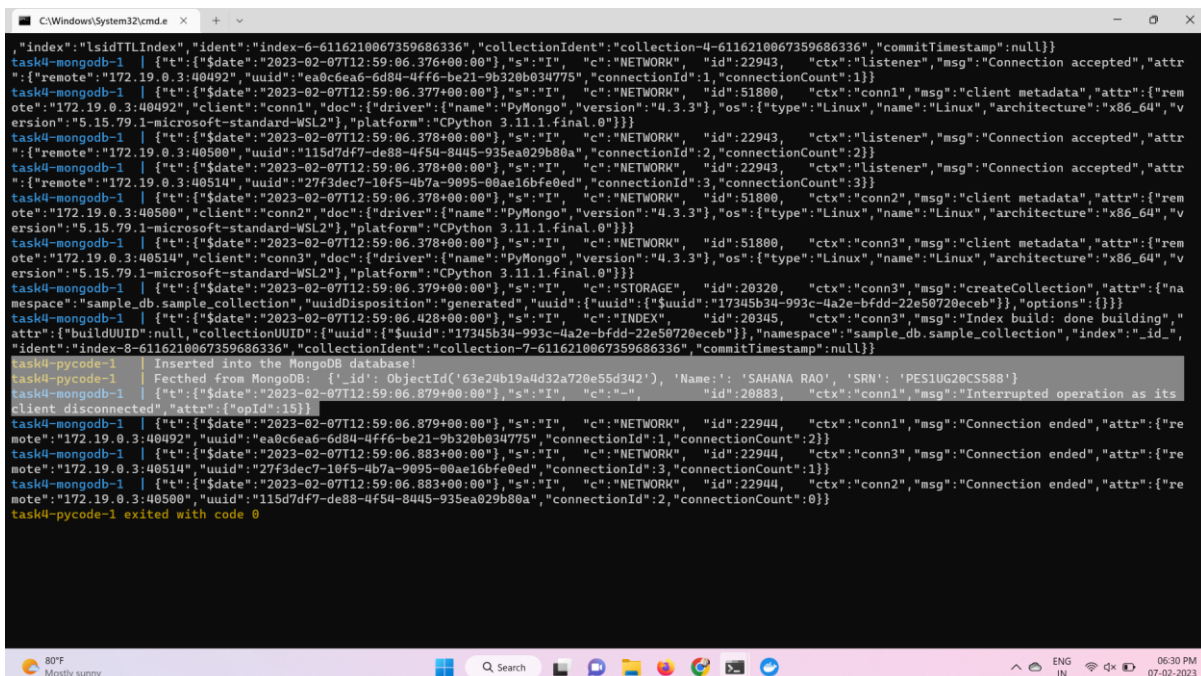
```
C:\Users\Sahana Rao\Desktop\PES1UG20CS588\SEM6\CC\LAB2\task3\task3-pymongo-docker build -t task3 .
[*] Building 0.1s (9/9) FINISHED
=> [internal] load build definition from Dockerfile                                0.0s
=> => transferring dockerfile: 31B                                              0.0s
=> [internal] load .dockerignore                                                 0.0s
=> => transferring context: 2B                                                  0.0s
=> [internal] load metadata for docker.io/library/python:latest                0.0s
=> [1/4] FROM docker.io/library/python                                         0.0s
=> [internal] load build context                                                0.0s
=> => transferring context: 406B                                                0.0s
=> CACHED [2/4] RUN apt-get update                                             0.0s
=> CACHED [3/4] RUN pip install pymongo                                       0.0s
=> [4/4] COPY sample.py sample.py                                             0.0s
=> exporting to image                                                          0.0s
=> => writing image sha256:1017d0bc7988a5cbda4499afbb0a5654362764297dbbad9ed2712f2a 0.0s
=> => naming to docker.io/library/task3                                         0.0s

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

C:\Users\Sahana Rao\Desktop\PES1UG20CS588\SEM6\CC\LAB2\task3\task3-pymongo-docker run --network=may-bridge-network task3
Inserted into the MongoDB database!
Fetched from MongoDB: {'_id': ObjectId('63e24a712673347c2e326458'), 'Name': 'SAHANA RAO', 'SRN': 'PES1UG20CS588'}

C:\Users\Sahana Rao\Desktop\PES1UG20CS588\SEM6\CC\LAB2\task3\task3-pymongo>
```

- 4a.jpg: Screenshot of python-mongodb application running as a docker-compose application



```
,"index":{"_id":"index-6-6116210067359686336","collectionId":"collection-4-6116210067359686336","commitTimestamp":null}}
task4-mongodb-1 | {"t":{"$date":"2023-02-07T12:59:06.376+00:00"},"s":"I", "c":"NETWORK", "id":22943, "ctx":"listener","msg":"Connection accepted","attr":{"remote":"172.19.0.3:40492","uid":"ea0c6ea6-6d84-4ff6-be21-9b320b034775","connectionId":1,"connectionCount":1}}
task4-mongodb-1 | {"t":{"$date":"2023-02-07T12:59:06.377+00:00"},"s":"I", "c":"NETWORK", "id":51800, "ctx":"conn1","msg":"client metadata","attr":{"remote":"172.19.0.3:40492","client":"conn1","doc":{"driver":{"name":"PyMongo","version":"4.3.3"},"os":{"type":"Linux","name":"Linux","architecture":"x86_64"},"version":"5.15.79.1-microsoft-standard-WSL2"},"platform":"CPython 3.11.1.final.0"}}}
task4-mongodb-1 | {"t":{"$date":"2023-02-07T12:59:06.378+00:00"},"s":"I", "c":"NETWORK", "id":22943, "ctx":"listener","msg":"Connection accepted","attr":{"remote":"172.19.0.3:40500","uid":"115d7df7-de88-4f54-8445-935ea029b80a","connectionId":2,"connectionCount":2}}
task4-mongodb-1 | {"t":{"$date":"2023-02-07T12:59:06.378+00:00"},"s":"I", "c":"NETWORK", "id":22943, "ctx":"listener","msg":"Connection accepted","attr":{"remote":"172.19.0.3:40514","uid":"27f3dec7-10f5-4b7a-9095-00ae16bfe0ed","connectionId":3,"connectionCount":3}}
task4-mongodb-1 | {"t":{"$date":"2023-02-07T12:59:06.378+00:00"},"s":"I", "c":"NETWORK", "id":51800, "ctx":"conn2","msg":"client metadata","attr":{"remote":"172.19.0.3:40500","client":"conn2","doc":{"driver":{"name":"PyMongo","version":"4.3.3"},"os":{"type":"Linux","name":"Linux","architecture":"x86_64"},"version":"5.15.79.1-microsoft-standard-WSL2"},"platform":"CPython 3.11.1.final.0"}}}
task4-mongodb-1 | {"t":{"$date":"2023-02-07T12:59:06.378+00:00"},"s":"I", "c":"NETWORK", "id":51800, "ctx":"conn3","msg":"client metadata","attr":{"remote":"172.19.0.3:40514","client":"conn3","doc":{"driver":{"name":"PyMongo","version":"4.3.3"},"os":{"type":"Linux","name":"Linux","architecture":"x86_64"},"version":"5.15.79.1-microsoft-standard-WSL2"},"platform":"CPython 3.11.1.final.0"}}}
task4-mongodb-1 | {"t":{"$date":"2023-02-07T12:59:06.379+00:00"},"s":"I", "c":"STORAGE", "id":20320, "ctx":"conn3","msg":"createCollection","attr":{"namespace":"sample_db.sample_collection","uuidDisposition":"generated","uuid":{"uuid":{"$uuid":"17345b34-993c-4a2e-bfdd-22e50720eceb"},"options":{"buildUUID":null,"collectionUUID":{"uuid":{"$uuid":"17345b34-993c-4a2e-bfdd-22e50720eceb"},"namespace":"sample_db.sample_collection","index":"_id","ident":"index-6-6116210067359686336","collectionId":"collection-7-6116210067359686336","commitTimestamp":null}}}}
task4-pycode-1 | Inserted into the MongoDB database!
task4-pycode-1 | Fetched from MongoDB: {'_id': ObjectId('63e24b19a4d32a720e55d342'), 'Name': 'SAHANA RAO', 'SRN': 'PES1UG20CS588'}
task4-mongodb-1 | {"t":{"$date":"2023-02-07T12:59:06.879+00:00"},"s":"I", "c":"-", "id":20883, "ctx":"conn1","msg":"Interrupted operation as its client disconnected","attr":{"opId":15}}
task4-mongodb-1 | {"t":{"$date":"2023-02-07T12:59:06.879+00:00"},"s":"I", "c":"NETWORK", "id":22944, "ctx":"conn1","msg":"Connection ended","attr":{"remote":"172.19.0.3:40492","uid":"ea0c6ea6-6d84-4ff6-be21-9b320b034775","connectionId":1,"connectionCount":2}}
task4-mongodb-1 | {"t":{"$date":"2023-02-07T12:59:06.883+00:00"},"s":"I", "c":"NETWORK", "id":22944, "ctx":"conn3","msg":"Connection ended","attr":{"remote":"172.19.0.3:40514","uid":"27f3dec7-10f5-4b7a-9095-00ae16bfe0ed","connectionId":3,"connectionCount":1}}
task4-mongodb-1 | {"t":{"$date":"2023-02-07T12:59:06.883+00:00"},"s":"I", "c":"NETWORK", "id":22944, "ctx":"conn2","msg":"Connection ended","attr":{"remote":"172.19.0.3:40500","uid":"115d7df7-de88-4f54-8445-935ea029b80a","connectionId":2,"connectionCount":0}}
task4-pycode-1 exited with code 0
```

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

```
C:\Windows\System32\cmd.e x + v
task4-mongodb-1 | {"t":{"$date":"2023-02-07T14:31:33.129+00:00"},"s":"I", "c":"NETWORK", "id":51800, "ctx":"conn3", "msg":"client metadata", "attr":{"remote":"172.19.0.5:39802", "client":"conn3", "doc":{"driver":{"name":"PyMongo", "version":"4.3.3"}, "os":{"type":"Linux", "name":"Linux", "architecture":"x86_64", "version":"5.15.79.1-microsoft-standard-WSL2"}, "platform":"CPython 3.11.1.final.0"}}}
task4-pycode-3 | Inserted into the MongoDB database!
task4-mongodb-1 | {"t":{"$date":"2023-02-07T14:31:33.134+00:00"},"s":"I", "c":"NETWORK", "id":22943, "ctx":"listener", "msg":"Connection accepted", "attr":{"remote":"172.19.0.4:56222", "uid":"ecb89de8-caf8-4bbc-b2e1-cldd22e11279", "connectionId":4, "connectionCount":4}}
task4-mongodb-1 | {"t":{"$date":"2023-02-07T14:31:33.135+00:00"},"s":"I", "c":"NETWORK", "id":51800, "ctx":"conn4", "msg":"client metadata", "attr":{"remote":"172.19.0.4:56222", "client":"conn4", "doc":{"driver":{"name":"PyMongo", "version":"4.3.3"}, "os":{"type":"Linux", "name":"Linux", "architecture":"x86_64", "version":"5.15.79.1-microsoft-standard-WSL2"}, "platform":"CPython 3.11.1.final.0"}}}
task4-mongodb-1 | {"t":{"$date":"2023-02-07T14:31:33.136+00:00"},"s":"I", "c":"NETWORK", "id":22943, "ctx":"listener", "msg":"Connection accepted", "attr":{"remote":"172.19.0.4:56232", "uid":"948ba090-635e-4472-92e7-7357257be85b", "connectionId":5, "connectionCount":5}}
task4-mongodb-1 | {"t":{"$date":"2023-02-07T14:31:33.137+00:00"},"s":"I", "c":"NETWORK", "id":22943, "ctx":"listener", "msg":"Connection accepted", "attr":{"remote":"172.19.0.4:56240", "uid":"cdecf1d4-483c-49b9-90e7-154e9bec98de", "connectionId":6, "connectionCount":6}}
task4-mongodb-1 | {"t":{"$date":"2023-02-07T14:31:33.137+00:00"},"s":"I", "c":"NETWORK", "id":51800, "ctx":"conn5", "msg":"client metadata", "attr":{"remote":"172.19.0.4:56232", "client":"conn5", "doc":{"driver":{"name":"PyMongo", "version":"4.3.3"}, "os":{"type":"Linux", "name":"Linux", "architecture":"x86_64", "version":"5.15.79.1-microsoft-standard-WSL2"}, "platform":"CPython 3.11.1.final.0"}}}
task4-mongodb-1 | {"t":{"$date":"2023-02-07T14:31:33.137+00:00"},"s":"I", "c":"NETWORK", "id":51800, "ctx":"conn6", "msg":"client metadata", "attr":{"remote":"172.19.0.4:56249", "client":"conn6", "doc":{"driver":{"name":"PyMongo", "version":"4.3.3"}, "os":{"type":"Linux", "name":"Linux", "architecture":"x86_64", "version":"5.15.79.1-microsoft-standard-WSL2"}, "platform":"CPython 3.11.1.final.0"}}}
task4-pycode-1 | Inserted into the MongoDB database!
task4-mongodb-1 | {"t":{"$date":"2023-02-07T14:31:33.171+00:00"},"s":"I", "c":"NETWORK", "id":22943, "ctx":"listener", "msg":"Connection accepted", "attr":{"remote":"172.19.0.3:51869", "uid":"2bacf15-7abd-426b-8ad7-66bac8137e44", "connectionId":7, "connectionCount":7}}
task4-mongodb-1 | {"t":{"$date":"2023-02-07T14:31:33.171+00:00"},"s":"I", "c":"NETWORK", "id":51800, "ctx":"conn7", "msg":"client metadata", "attr":{"remote":"172.19.0.3:51869", "client":"conn7", "doc":{"driver":{"name":"PyMongo", "version":"4.3.3"}, "os":{"type":"Linux", "name":"Linux", "architecture":"x86_64", "version":"5.15.79.1-microsoft-standard-WSL2"}, "platform":"CPython 3.11.1.final.0"}}}
task4-mongodb-1 | {"t":{"$date":"2023-02-07T14:31:33.173+00:00"},"s":"I", "c":"NETWORK", "id":22943, "ctx":"listener", "msg":"Connection accepted", "attr":{"remote":"172.19.0.3:51862", "uid":"2de7cfd1-11a7-4e4a-ad95-32f194ca9020", "connectionId":8, "connectionCount":8}}
task4-mongodb-1 | {"t":{"$date":"2023-02-07T14:31:33.173+00:00"},"s":"I", "c":"NETWORK", "id":22943, "ctx":"listener", "msg":"Connection accepted", "attr":{"remote":"172.19.0.3:51872", "uid":"c6805174-1b2d-4ece-b505-7c668050f507", "connectionId":9, "connectionCount":9}}
task4-mongodb-1 | {"t":{"$date":"2023-02-07T14:31:33.174+00:00"},"s":"I", "c":"NETWORK", "id":51800, "ctx":"conn8", "msg":"client metadata", "attr":{"remote":"172.19.0.3:51862", "client":"conn8", "doc":{"driver":{"name":"PyMongo", "version":"4.3.3"}, "os":{"type":"Linux", "name":"Linux", "architecture":"x86_64", "version":"5.15.79.1-microsoft-standard-WSL2"}, "platform":"CPython 3.11.1.final.0"}}}
task4-mongodb-1 | {"t":{"$date":"2023-02-07T14:31:33.174+00:00"},"s":"I", "c":"NETWORK", "id":51800, "ctx":"conn9", "msg":"client metadata", "attr":{"remote":"172.19.0.3:51872", "client":"conn9", "doc":{"driver":{"name":"PyMongo", "version":"4.3.3"}, "os":{"type":"Linux", "name":"Linux", "architecture":"x86_64", "version":"5.15.79.1-microsoft-standard-WSL2"}, "platform":"CPython 3.11.1.final.0"}}}
task4-pycode-2 | Inserted into the MongoDB database!
task4-pycode-1 | Fetched from MongoDB: {'_id': ObjectId('63e24b19a4d32a720e55d342'), 'Name': 'SAHANA RAO', 'SRN': 'PES1UG20CS588'}
task4-mongodb-1 | {"t":{"$date":"2023-02-07T14:31:33.629+00:00"},"s":"I", "c":"-", "id":20883, "ctx":"conn1", "msg":"Interrupted operation as its
```