

## Docker:

It is a platform that allows package applications and their dependencies into standardized units called containers.

## Tasks

As you have already installed docker in previous days tasks, now is the time to run Docker commands.

- a. Use the docker run command to start a new container and interact with it through the command line. [Hint: docker run hello-world]

```
ubuntu@ip-172-31-24-155:~$ systemctl status docker
● docker.service - Docker Application Container Engine
   Loaded: loaded (/usr/lib/systemd/system/docker.service; enabled; preset: enabled)
   Active: active (running) since Tue 2024-08-13 09:50:56 UTC; 3h 13min ago
 TriggeredBy: ● docker.socket
    Docs: https://docs.docker.com
   Main PID: 861 (dockerd)
     Tasks: 22
    Memory: 244.8M (peak: 392.6M)
       CPU: 29.832s
   CGroup: /system.slice/docker.service
           └─ 861 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.sock
              └─ 2844 /usr/bin/docker-proxy -proto tcp -host-ip 0.0.0.0 -host-port 5000 -container-ip 172.17.0.2 -container-port 5000
                 └─ 2848 /usr/bin/docker-proxy -proto tcp -host-ip :: -host-port 5000 -container-ip 172.17.0.2 -container-port 5000

Aug 13 12:35:27 ip-172-31-24-155 dockerd[861]: time="2024-08-13T12:35:27.655079425Z" level=info msg="trying next host" error="pull a
Aug 13 12:35:27 ip-172-31-24-155 dockerd[861]: time="2024-08-13T12:35:27.800881389Z" level=info msg="trying next host" error="pull a
Aug 13 12:35:27 ip-172-31-24-155 dockerd[861]: time="2024-08-13T12:35:27.915953917Z" level=info msg="trying next host" error="pull a
Aug 13 12:35:28 ip-172-31-24-155 dockerd[861]: time="2024-08-13T12:35:28.032514595Z" level=info msg="trying next host" error="pull a
Aug 13 12:35:28 ip-172-31-24-155 dockerd[861]: time="2024-08-13T12:35:28.032698379Z" level=error msg="Handler for POST /v1.43/plugin
Aug 13 12:35:43 ip-172-31-24-155 dockerd[861]: time="2024-08-13T12:35:43.796527284Z" level=info msg="trying next host" error="pull a
Aug 13 12:35:43 ip-172-31-24-155 dockerd[861]: time="2024-08-13T12:35:43.912961518Z" level=info msg="trying next host" error="pull a
Aug 13 12:35:44 ip-172-31-24-155 dockerd[861]: time="2024-08-13T12:35:44.030723935Z" level=info msg="trying next host" error="pull a
Aug 13 12:35:44 ip-172-31-24-155 dockerd[861]: time="2024-08-13T12:35:44.147933416Z" level=info msg="trying next host" error="pull a
Aug 13 12:35:44 ip-172-31-24-155 dockerd[861]: time="2024-08-13T12:35:44.148095899Z" level=error msg="Handler for POST /v1.43/plugin
```

```
ubuntu@ip-172-31-24-155:~$ docker run hello-world
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
c1ec31eb5944: Pull complete
Digest: sha256:1408fec50309afee38f3535383f5b09419e6dc0925bc69891e79d84cc4cdcec6
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/>

```
ubuntu@ip-172-31-24-155:~$ |
```

- b. Use the docker inspect command to view detailed information about a container or image.

```
ubuntu@ip-172-31-24-155:~$ docker images
REPOSITORY      TAG          IMAGE ID       CREATED        SIZE
multistage      latest       c11e8efb6d09   About an hour ago   151MB
python-full     latest       fa422dafd468   About an hour ago   1.02GB
python          3.11-slim   10f461201cdb   2 weeks ago       130MB
python          3.11        dbb93f5d8e5a   2 weeks ago       1.01GB
hello-world     latest       d2c94e258dcb   15 months ago     13.3kB
ubuntu@ip-172-31-24-155:~$ docker inspect hello-world
[
  {
    "Id": "sha256:d2c94e258dcb3c5ac2798d32e1249e42ef01cba4841c2234249495f87264ac5a",
    "RepoTags": [
      "hello-world:latest"
    ],
    "RepoDigests": [
      "hello-world@sha256:1408fec50309afee38f3535383f5b09419e6dc0925bc69891e79d84cc4cdcec6"
    ],
    "Parent": "",
    "Comment": "buildkit.dockerfile.v0",
    "Created": "2023-05-02T16:49:27Z",
    "Container": "",
    "ContainerConfig": {
      "Hostname": "",
      "Domainname": "",
      "User": "",
      "AttachStdin": false,
      "AttachStdout": false,
      "AttachStderr": false,
      "Tty": false,
      "OpenStdin": false,
      "StdinOnce": false,
      "Env": null,
      "Cmd": null,
```

- c. Use the docker port command to list the port mappings for a container.

```
ubuntu@ip-172-31-24-155:~$ docker ps
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS                               NAMES
6ee75a598784  multistage:latest  "python app.py"         50 minutes ago Up 50 minutes  0.0.0.0:5000->5000/tcp, :::5000->5000/tcp  flask-app
ubuntu@ip-172-31-24-155:~$ docker port flask-app
5000/tcp -> 0.0.0.0:5000
5000/tcp -> [::]:5000
ubuntu@ip-172-31-24-155:~$
```

- Use the docker stats command to view resource usage statistics for one or more containers.

```
ubuntu@ip-172-31-24-155:~$ docker stats flask-app
CONTAINER ID   NAME          CPU %       MEM USAGE / LIMIT   MEM %    NET I/O       BLOCK I/O  PIDS
6ee75a598784  flask-app    0.04%      46.37MiB / 957.4MiB  4.84%    1.91kB / 704B  0B / 3.97MB  3
CONTAINER ID   NAME          CPU %       MEM USAGE / LIMIT   MEM %    NET I/O       BLOCK I/O  PIDS
6ee75a598784  flask-app    0.04%      46.37MiB / 957.4MiB  4.84%    1.91kB / 704B  0B / 3.97MB  3
CONTAINER ID   NAME          CPU %       MEM USAGE / LIMIT   MEM %    NET I/O       BLOCK I/O  PIDS
6ee75a598784  flask-app    0.12%      46.37MiB / 957.4MiB  4.84%    1.91kB / 704B  0B / 3.97MB  3
CONTAINER ID   NAME          CPU %       MEM USAGE / LIMIT   MEM %    NET I/O       BLOCK I/O  PIDS
6ee75a598784  flask-app    0.12%      46.37MiB / 957.4MiB  4.84%    1.91kB / 704B  0B / 3.97MB  3
CONTAINER ID   NAME          CPU %       MEM USAGE / LIMIT   MEM %    NET I/O       BLOCK I/O  PIDS
6ee75a598784  flask-app    0.12%      46.37MiB / 957.4MiB  4.84%    1.91kB / 704B  0B / 3.97MB  3
CONTAINER ID   NAME          CPU %       MEM USAGE / LIMIT   MEM %    NET I/O       BLOCK I/O  PIDS
6ee75a598784  flask-app    0.12%      46.37MiB / 957.4MiB  4.84%    1.91kB / 704B  0B / 3.97MB  3
CONTAINER ID   NAME          CPU %       MEM USAGE / LIMIT   MEM %    NET I/O       BLOCK I/O  PIDS
6ee75a598784  flask-app    0.12%      46.37MiB / 957.4MiB  4.84%    1.91kB / 704B  0B / 3.97MB  3
CONTAINER ID   NAME          CPU %       MEM USAGE / LIMIT   MEM %    NET I/O       BLOCK I/O  PIDS
6ee75a598784  flask-app    0.13%      46.37MiB / 957.4MiB  4.84%    1.91kB / 704B  0B / 3.97MB  3
CONTAINER ID   NAME          CPU %       MEM USAGE / LIMIT   MEM %    NET I/O       BLOCK I/O  PIDS
```

- Use the docker top command to view the processes running inside a container.

```
ubuntu@ip-172-31-24-155:~$ docker ps
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS                               NAMES
6ee75a598784   multistage:latest "python app.py"         58 minutes ago Up 58 minutes 0.0.0.0:5000->5000/tcp, :::5000->5000/tcp fla
sk-app
ubuntu@ip-172-31-24-155:~$ docker top flask-app
UID           CMD             PID             PPID            C              STIME          TTY            TIME
root          python app.py   2901            2872            0              12:28         ?              00:00:00
root          /usr/local/bin/python app.py 2926            2901            0              12:28         ?              00:00:04
ubuntu@ip-172-31-24-155:~$
```

- Use the docker save command to save an image to a tar archive.

```
ubuntu@ip-172-31-24-155:~$ docker images
REPOSITORY    TAG       IMAGE ID       CREATED        SIZE
multistage    latest   c11e8efb6d09   About an hour ago 151MB
python-full   latest   fa422dafd468   About an hour ago 1.02GB
python        3.11     dbb93f5d8e5a   2 weeks ago    1.01GB
python        3.11-slim 10f461201cdb   2 weeks ago    130MB
hello-world   latest   d2c94e258dcb   15 months ago   13.3kB
ubuntu@ip-172-31-24-155:~$ docker save multistage
cowardly refusing to save to a terminal. Use the -o flag or redirect
ubuntu@ip-172-31-24-155:~$ docker save -o multistage_image.tar multistage
ubuntu@ip-172-31-24-155:~$ ls
docker-projects  multistage_image.tar
ubuntu@ip-172-31-24-155:~$
```

- Use the docker load command to load an image from a tar archive.

```
ubuntu@ip-172-31-24-155:~$ docker images
REPOSITORY    TAG       IMAGE ID       CREATED        SIZE
multistage    latest   c11e8efb6d09   About an hour ago 151MB
python-full   latest   fa422dafd468   About an hour ago 1.02GB
python        3.11     dbb93f5d8e5a   2 weeks ago    1.01GB
python        3.11-slim 10f461201cdb   2 weeks ago    130MB
hello-world   latest   d2c94e258dcb   15 months ago   13.3kB
ubuntu@ip-172-31-24-155:~$ docker save multistage
cowardly refusing to save to a terminal. Use the -o flag or redirect
ubuntu@ip-172-31-24-155:~$ docker save -o multistage_image.tar multistage
ubuntu@ip-172-31-24-155:~$ ls
docker-projects  multistage_image.tar
ubuntu@ip-172-31-24-155:~$ pwd
/home/ubuntu
ubuntu@ip-172-31-24-155:~$ docker load -i /home/ubuntu/multistage_image.tar
Loaded image: multistage:latest
ubuntu@ip-172-31-24-155:~$
```