Experiment -1.4

Student Name: Ayush Pandey   **UID:** 22BDO10038
Branch: CSE-DevOps   **Section/Group:** 22BCD-1 (A)
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Subject Name: Docker and Kubernetes   **Subject Code:** 22CSH-343

1. Aim/Overview of the practical:

To manage Volumes and Containers for storing and retrieval of data in Docker.

- To focus on understanding and working with Docker volumes.
- To create and manage volumes
- Learn to create a container that uses a volume to store and retrieve data.

2. Apparatus: VM ware workstation, Ubuntu Linux , Docker.

3. Steps for experiment/practical:

Docker volumes:

A Docker volume allows data to persist, even when a container is deleted.

Volumes are also a convenient way to share data between the host and the container.

Docker volumes exist outside the Union File System of read-only and read-write layers.

Volumes can also be shared between containers.

1. Creating Docker Volume

To create a Docker Volume, we can use the Volume Create command

```
ayush@Linux:~$ sudo docker volume create vol-demo
[sudo] password for ayush:
vol-demo
```

2. Mounting Volume with a Container

After you have created a Volume, you can mount it with a Docker Container **-v** flag along with the Docker run command.

```
ayush@Linux:~$ sudo docker run -it -v vol-demo:/usr/src/app ubuntu bash
Unable to find image 'ubuntu:latest' locally
^[[A^[[Blatest: Pulling from library/ubuntu

31e907dcc94a: Pull complete
Digest: sha256:8a37d68f4f73ebf3d4efafbcf66379bf3728902a8038616808f04e34a9ab63ee
Status: Downloaded newer image for ubuntu:latest
^[[A^[[B
root@ad7968238bd7:/#
root@ad7968238bd7:/# ls
bin    dev   home   lib64   mnt   proc   run    srv   tmp   var
boot   etc   lib    media   opt   root   sbin   sys   usr
```

3. Listing all the Docker Volumes

You can list all your Docker Volumes using the Docker Volume **ls** command.

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```
ayush@Linux:~$ sudo usermod -aG docker ayush
ayush@Linux:~$ newgrp docker
ayush@Linux:~$ docker volume ls
DRIVER      VOLUME NAME
local       vol-demo
```

4. Inspecting Docker Volumes

You can get the details of your Docker Volumes using the Volume Inspect Command.

```
ayush@Linux:~$ sudo docker volume inspect vol-demo
[
    {
        "CreatedAt": "2024-08-26T12:04:37+05:30",
        "Driver": "local",
        "Labels": null,
        "Mountpoint": "/var/lib/docker/volumes/vol-demo/_data",
        "Name": "vol-demo",
        "Options": null,
        "Scope": "local"
    }
]
```

5. Removing specific Docker Volume

To remove a particular Docker Volume, you can specify the name in the Docker Volume **rm** command.

```
ayush@Linux:~$ sudo docker volume rm vol-demo
Error response from daemon: remove vol-demo: volume is in use - [ad7968238bd7ba710ce8c7cb3c836b57b9526a1a2f81530e9dac5de328eccceb]
ayush@Linux:~$ docker ps -a --filter volume=vol-demo
CONTAINER ID    IMAGE      COMMAND    CREATED          STATUS                   PORTS      NAMES
ad7968238bd7    ubuntu     "bash"     17 minutes ago   Exited (0) 8 minutes ago            pensive_tu
ayush@Linux:~$ docker stop ad7968238bd7
ad7968238bd7
ayush@Linux:~$ docker rm ad7968238bd7
ad7968238bd7
ayush@Linux:~$ sudo docker volume rm vol-demo
vol-demo
```

6. Removing all the Docker Volumes

To remove all the Docker volumes together, you can use the following command. Note that before removing a Docker Volume, you need to make sure that it is not mounted to any Container.

```
ayush@Linux:~$ sudo docker volume rm $(sudo docker volume ls -q)
"docker volume rm" requires at least 1 argument.
See 'docker volume rm --help'.

Usage:  docker volume rm [OPTIONS] VOLUME [VOLUME...]

Remove one or more volumes
ayush@Linux:~$ sudo docker volume ls
DRIVER     VOLUME NAME
```

Create a Docker volume and specify a host directory

```
ayush@Linux:~$ sudo docker run -it -v /web_html:/var/www/html ubuntu /bin/bash
root@b1101fa59dd1:/# cd /var/www/html
root@b1101fa59dd1:/var/www/html# ls
root@b1101fa59dd1:/var/www/html# echo .> text.txt
root@b1101fa59dd1:/var/www/html# ls
text.txt
root@b1101fa59dd1:/var/www/html# cat text.txt
.
root@b1101fa59dd1:/var/www/html# vim text.txt
bash: vim: command not found
root@b1101fa59dd1:/var/www/html# vi text.txt
bash: vi: command not found
root@b1101fa59dd1:/var/www/html# vi file.txt
bash: vi: command not found
root@b1101fa59dd1:/var/www/html# echo "HEllo world" >> file.txt
root@b1101fa59dd1:/var/www/html# ls
file.txt  text.txt
root@b1101fa59dd1:/var/www/html# g
```

Learning outcomes (What I have learnt):

1. I have learned the concept of containerization.

2. I have learned to configure Docker to work with different environments.

3. I have learned how to build docker images using Docker file.

4. I have learned the purpose of Docker volumes and their role in data persistence.

5. I learned how to use Docker Hub to pull and push Docker images.

Evaluation Grid (To be created as per the SOP and Assessment guidelines by the faculty):

Sr. No.	Parameters	Marks Obtained	Maximum Marks
1.			
2.			
3.			