Experiment -1.4

Student Name: Chayan Gope
UID: 22BDO10036
Branch: AIT-CSE-DevOps
Section/Group: 22BCD-1(A)
Semester: 5
Date of Performance: 26-08-24
Subject Name: Docker and Kubernetes
Subject Code: 22CSH-343

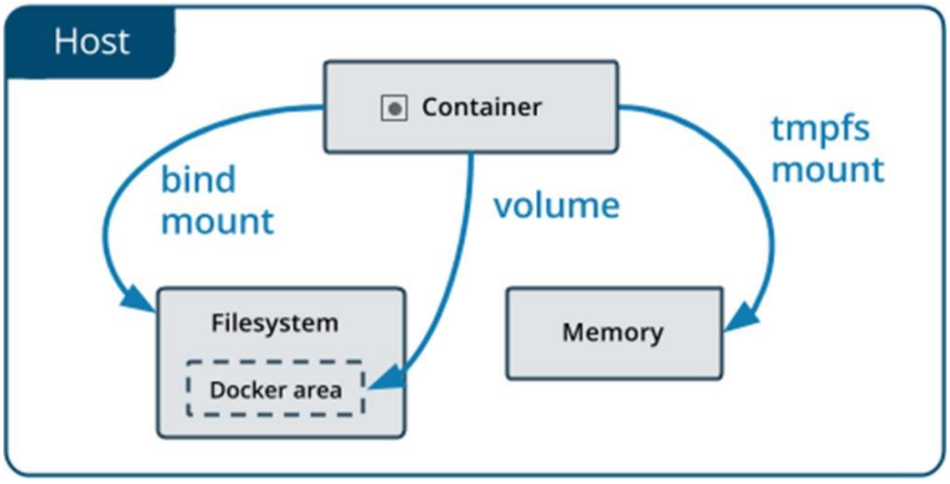
1. Aim/Overview of the practical:

To manage Volumes and Containers for storing and retrieving data in Docker.

2. Apparatus: PC, Docker Engine, DockerHub, Ubuntu Linux

3. Steps for experiment/practical:

- **Docker volumes:**
  1. A Docker volume allows data to persist, even when a container is deleted.
  2. Volumes are also a convenient way to share data between the host and the container.
  3. Docker volumes exist outside the Union File System of read-only and read-write layers.
  4. Volumes can also be shared between containers.



- **Creating a new volume**

  Syntax: docker volume create <vol_name>

- **Mounting volume with a container**

  Syntax:docker run -it -v <volume-path-in-local-machine>:<dest-path-in-container> <image-name>

  You can move to the destination directory inside the Container to verify whether the volume has been successfully mounted.

- **Listing all the docker volumes:**

  Syntax: docker volume ls

- **Inspecting docker volumes**

  Syntax: docker volume inspect <volume-name>

- **Removing specific docker volume or all the volumes**

  Syntax: docker volume rm <volume-name>

  Syntax: docker volume rm $(sudo docker volume ls -q)

4. Result/Output/Writing Summary:

```
chayan@chayan-virtual-machine:~$ docker --version
Docker version 24.0.7, build 24.0.7-0ubuntu2~22.04.1
chayan@chayan-virtual-machine:~$ docker volume create demo
chayan@chayan-virtual-machine:~$ docker run -it -v demo:/usr/src/app ubuntu bash
root@d67150d0c61e:/# ls
bin   dev  home  lib64  mnt  proc  run   srv  tmp  var
boot  etc  lib   media  opt  root  sbin  sys  usr
root@d67150d0c61e:/# cd usr
root@d67150d0c61e:/usr# ls
bin  games  include  lib  lib64  libexec  local  sbin  share  src
root@d67150d0c61e:/usr# cd src
root@d67150d0c61e:/usr/src# ls
app
root@d67150d0c61e:/usr/src# exit
exit
chayan@chayan-virtual-machine:~$ docker volume ls
DRIVER    VOLUME NAME
local     demo
```

```
chayan@chayan-virtual-machine:~$ docker volume inspect demo
[
    {
        "CreatedAt": "2024-08-26T12:04:24+05:30",
        "Driver": "local",
        "Labels": null,
        "Mountpoint": "/var/lib/docker/volumes/demo/_data",
        "Name": "demo",
        "Options": null,
        "Scope": "local"
    }
]
chayan@chayan-virtual-machine:~$ docker volume rm demo
Error response from daemon: remove demo: volume is in use - [d67150d0c61e998fbde8fe8af
fa33ffc409b5535871c1bafc5709a66b25c535d]
chayan@chayan-virtual-machine:~$ docker ps
CONTAINER ID   IMAGE     COMMAND   CREATED   STATUS    PORTS     NAMES
chayan@chayan-virtual-machine:~$ docker ps -a
CONTAINER ID   IMAGE         COMMAND       CREATED          STATUS
  PORTS     NAMES
d67150d0c61e   ubuntu        "bash"        17 minutes ago   Exited (0) 9 minutes ago
            upbeat_heyrovsky
a57117863275   ubuntu        "/bin/bash"   17 hours ago     Exited (137) 17 hours ago
            two
```

```
chayan@chayan-virtual-machine:~$ docker stop d67150d0c61e
d67150d0c61e
chayan@chayan-virtual-machine:~$ docker rm d67150d0c61e
d67150d0c61e
chayan@chayan-virtual-machine:~$ docker volume rm demo
demo
chayan@chayan-virtual-machine:~$ docker volume ls
DRIVER    VOLUME NAME
chayan@chayan-virtual-machine:~$ docker volume rm $(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
chayan@chayan-virtual-machine:~$ docker volume ls
DRIVER    VOLUME NAME
chayan@chayan-virtual-machine:~$ docker run -it -v /home/chayan/Desktop/Web_html:/var/
www/html centos /bin/bash
Unable to find image 'centos:latest' locally
latest: Pulling from library/centos
a1d0c7532777: Pull complete
Digest: sha256:a27fd8080b517143cbbbab9dfb7c8571c40d67d534bbdee55bd6c473f432b177
```

```
chayan@chayan-virtual-machine:~$ docker run -it -v /home/chayan/Desktop/Web_html:/var/
www/html centos /bin/bash
Unable to find image 'centos:latest' locally
latest: Pulling from library/centos
a1d0c7532777: Pull complete
Digest: sha256:a27fd8080b517143cbbbab9dfb7c8571c40d67d534bbdee55bd6c473f432b177
Status: Downloaded newer image for centos:latest
[root@ecb8e44219ce /]# cd /var/www/html
[root@ecb8e44219ce html]# ls
[root@ecb8e44219ce html]# cd /var/www/html
[root@ecb8e44219ce html]# echo "Hello World" >> file.txt
[root@ecb8e44219ce html]# ls
file.txt
[root@ecb8e44219ce html]#
```

1. `Volumes` are stored in the host filesystem that Docker manages.
2. `Bind mounts` are stored anywhere on the host system.
3. `tmpfs mounts` are stored in the host memory only.
4. Originally, the ` — mount` flag was used for Docker Swarm services and the ` — volume` flag was used for standalone containers.
5. If the container no longer exists, the data is lost,
6. The container's writable layer is tightly coupled to the host machine, and
7. To manage the file system, you need a storage driver that provides a union file system, using the Linux kernel. This extra abstraction reduces performance compared to `data volumes` which write directly to the filesystem.

Learning outcomes (What I have learned):

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 Dockerfile.

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.			