St. Francis Institute of Technology, Mumbai-400 103
Department Of Information Technology

A.Y. 2024-2025
Class: TE-ITA/B, Semester: V

Subject: **DevOps Lab**

Experiment – 9: a. To understand Docker Architecture and Container Life Cycle, install Docker and execute docker commands to manage images and interact with containers. b. To learn Dockerfile instructions, build an image for a sample web application using Dockerfile

1. **Aim: a.** To understand Docker Architecture and Container Life Cycle, install Docker and execute docker commands to manage images and interact with containers. b. To learn Dockerfile instructions, build an image for a sample web application using Dockerfile.
2. **Objectives:** Aim of this experiment is that, the students will learn:
   - Introduction to Docker Architecture
   - To use Docker to Build, ship and manage applications using containerization
   - To understand concept of containerization
   - To analyze the Containerization of OS images and deployment of applications over Docker
3. **Outcomes:** After study of this experiment, the students will learn following:
   - Introduction to Docker Architecture
   - Container Life Cycle
   - Understanding images and containers
   - Publishing image on Docker Hub.
   - Create and implement docker images using Dockerfile.
   - Container Lifecycle and working with containers.
   - To Build, deploy and manage web or software application on Docker Engine.
4. **Prerequisite:** None
5. **Requirements:** Docker Desktop, JDK, Personal Computer, Windows operating system, Internet Connection, Microsoft Word.
6. **Pre-Experiment Exercise:**
   Brief Theory: Refer shared material
7. **Laboratory Exercise**
   A. **Procedure:**
      a. **Answer the following:**
         - What are docker containers and docker images?
         - Explain docker architecture with diagram.
         - What is a Dockerfile?
         - Explain Dockerfile commands with syntax and example.

      b. **Execute following (Refer the shared material) and attach screenshots:**
         - Create Docker Hub account
         - Download and install Docker Desktop
         - Execute docker commands to manage images and interact with containers
         - Create a Dockerfile
         - Create an html file

- Build and run the web application on Docker Engine

8. Post-Experiments Exercise

A. Extended Theory:

Nil

B. Questions:

- Write all Docker commands with syntax and example
- Explain differences between VMs and docker containers
- What is a Docker cheat sheet?
- Why do we require volumes for Docker?

C. Conclusion:

- Write what was performed in the experiment.
- Write the significance of the topic studied in the experiment.

D. References:

https://www.youtube.com/watch?v=zJ6WbK9zFpI
https://www.simplilearn.com/tutorials/docker-tutorial
https://www.edureka.co/blog/docker-explained/
https://www.youtube.com/watch?v=zJ6WbK9zFpI
https://www.simplilearn.com/tutorials/docker-tutorial
https://www.edureka.co/blog/docker-explained/
https://www.youtube.com/watch?v=3c-iBn73dDE

7a. Answer the following:

- **What are docker containers and docker images?**

Answer: 1. Docker Containers: Containers are lightweight, isolated environments that encapsulate an application and its dependencies. They provide a consistent environment across different platforms and ensure that the software runs reliably regardless of where it is deployed (local machine, server, cloud, etc.). Each container is based on a Docker image.

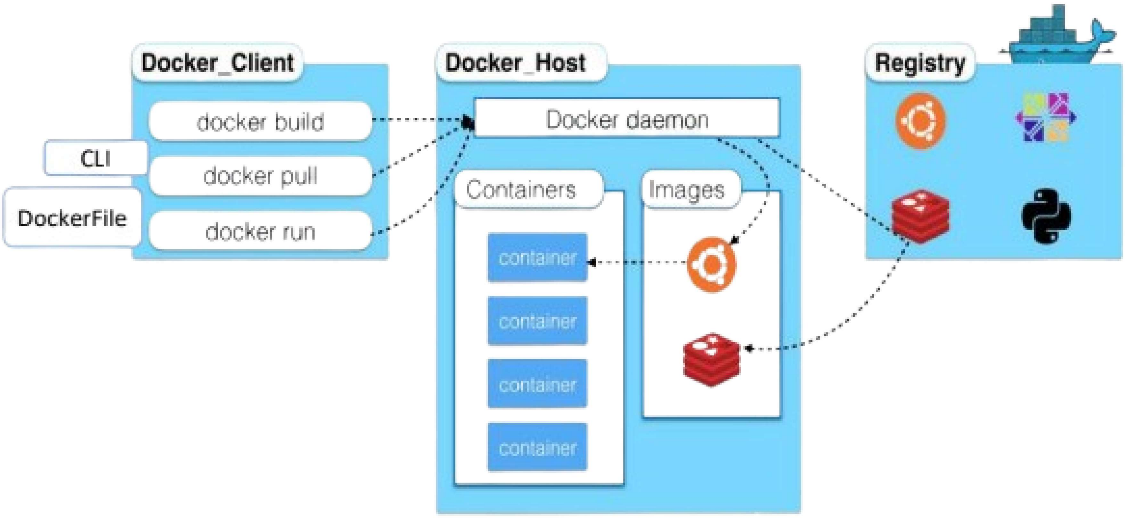
2. Docker Images: Docker images are immutable, read-only templates that contain the application code, libraries, dependencies, and configurations needed to create a container. They are built in layers and used to create containers. Once created, images can be reused, shared, and versioned.

- **Explain docker architecture with diagrams.**

Answer: Docker architecture consists of several key components:

- **Docker Client**: The user interface for Docker. It allows users to interact with Docker using commands like docker build, docker run, and docker pull. The client communicates with the Docker daemon (server) through a REST API.
- **Docker Daemon**: Known as dockerd, the daemon runs on the host machine and manages Docker objects like containers, images, networks, and volumes. It listens to Docker API requests and performs actions like building, running, and managing containers.
- **Docker Registries**: A registry stores Docker images. Docker Hub is the default public registry, but private registries can also be used. When the client requests an image that is not available locally, the daemon pulls it from the registry.
- **Docker Images**: These are templates used to create containers. Each image consists of layers, and changes to the image (e.g., installing software or copying files) create new layers.

- **Docker Containers**: Containers are instances of Docker images. They are lightweight and isolated from the host system, containing everything the application needs to run.



- **What is a Dockerfile?**

Answer: A **Dockerfile** is a script containing a series of instructions that specify how to build a Docker image. It automates the image creation process, including setting the base image, installing dependencies, and configuring the environment. Docker uses the Dockerfile to assemble an image step-by-step.

- **Explain Dockerfile commands with syntax and examples.**

Answer: Below are some common Dockerfile commands:

FROM: Specifies the base image to build upon

```
FROM ubuntu:20.04
```

Example: Use Ubuntu 20.04 as the base image.

RUN: Executes commands inside the image at build time.

```
RUN apt-get update && apt-get install -y nginx
```

Example: Updates the package manager and installs NGINX.

COPY: Copies files from the host machine to the container.

```
COPY ./app /usr/src/app
```

Example: Copy the app directory to /usr/src/app in the container.

CMD: Specifies the default command to run when a container is started.

```
CMD ["nginx", "-g", "daemon off;"]
```

Example: Start NGINX in the foreground when the container starts.

EXPOSE: Exposes a port on the container to be accessed externally.

```
EXPOSE 80
```

Example: Exposes port 80 for incoming HTTP connections.

WORKDIR: Sets the working directory for any subsequent instructions.

```
WORKDIR /usr/src/app
```

Example: Set /usr/src/app as the working directory.

ENV: Defines environment variables in the container.

```
ENV APP_ENV production
```

Example: Set the APP_ENV environment variable to production.

Example Dockerfile:

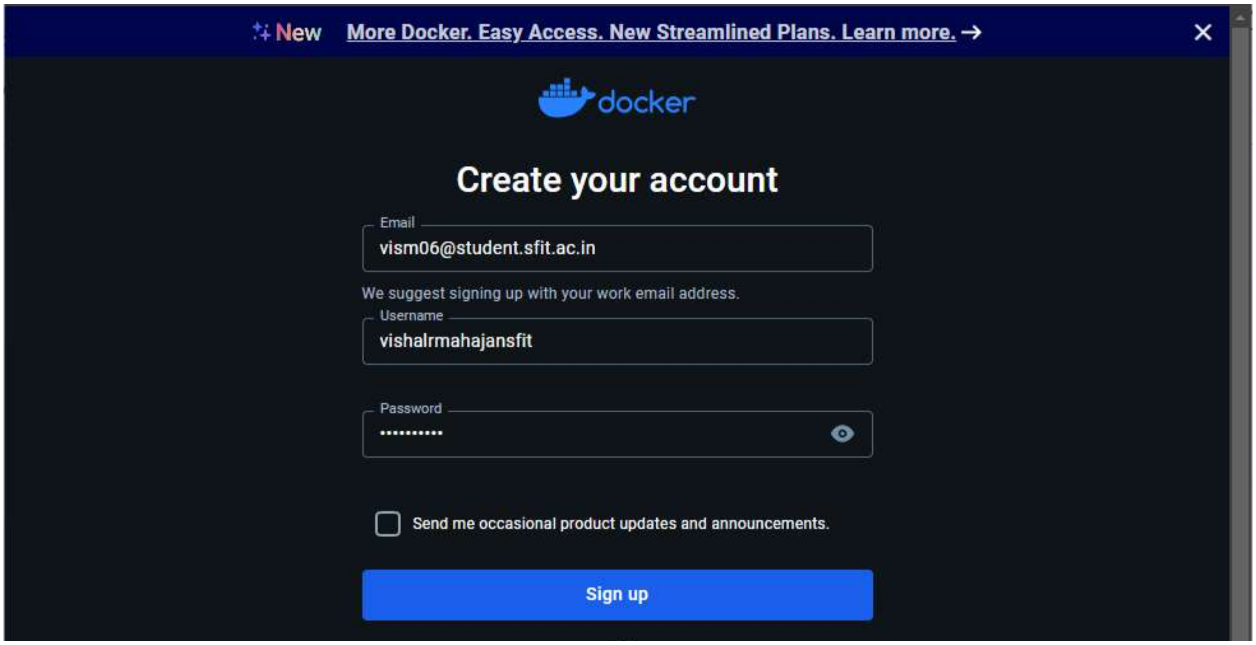
```
# Set base image
FROM node:14
```

```
# Set working directory
WORKDIR /usr/src/app

# Copy package.json and install dependencies
COPY package*.json ./
RUN npm install

# Copy the rest of the application code
COPY . .

# Expose the application port
EXPOSE 3000

# Run the application
CMD ["npm", "start"]
```

This Dockerfile uses the Node.js base image, installs dependencies, and starts the application on port 3000.

7b. Execute following (Refer the shared material) and attach screenshots:

- Create Docker Hub account


New
More Docker. Easy Access. New Streamlined Plans. Learn more. →
docker

Create your account

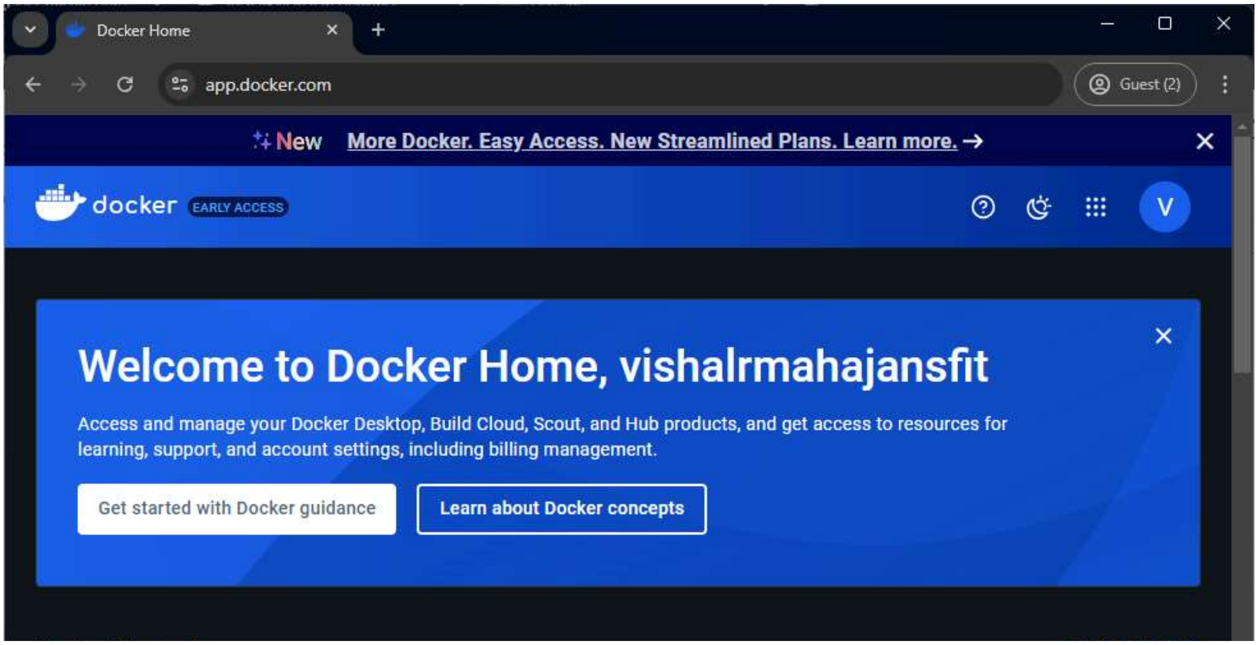
Email: vism06@student.sfit.ac.in

We suggest signing up with your work email address.

Username: vishalrmahajansfit

Password: ••••••••••

□ Send me occasional product updates and announcements.


Docker Home
app.docker.com
Guest (2)
New
More Docker. Easy Access. New Streamlined Plans. Learn more. →
docker
EARLY ACCESS
V

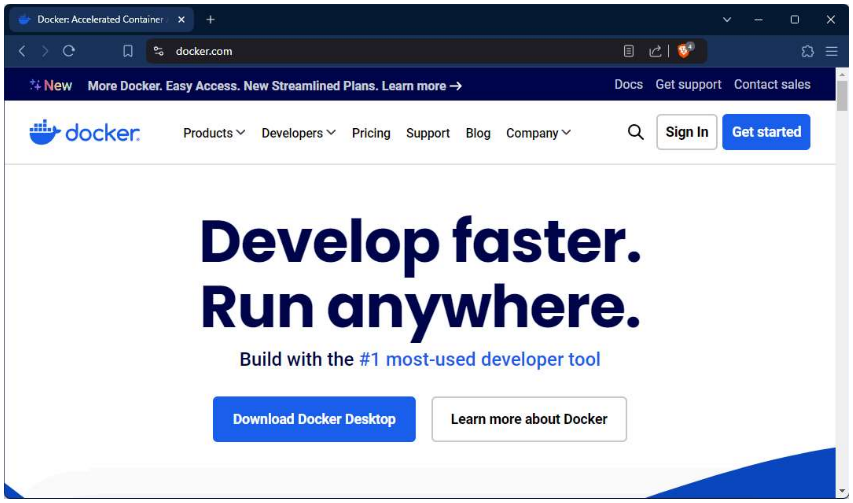
Welcome to Docker Home, vishalrmahajansfit

Access and manage your Docker Desktop, Build Cloud, Scout, and Hub products, and get access to resources for learning, support, and account settings, including billing management.

Get started with Docker guidance
Learn about Docker concepts

The Docker account has been successfully created with the username **vishalrmahajansfit**.

- Download and install Docker Desktop



Docker: Accelerated Container

docker.com

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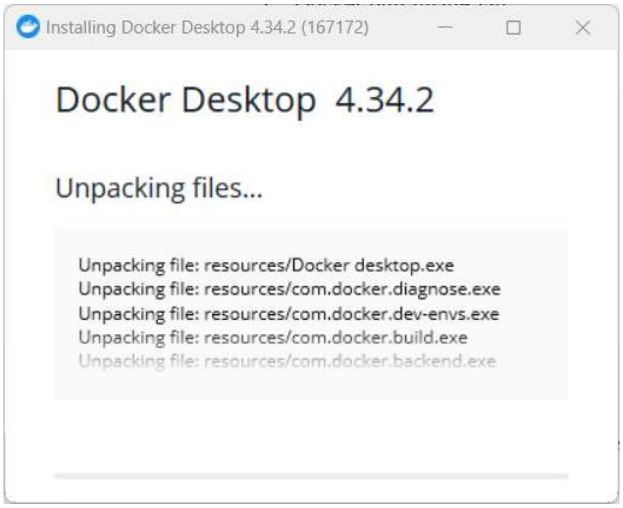
Get started

Develop faster.
Run anywhere.

Build with the #1 most-used developer tool

Download Docker Desktop

Learn more about Docker

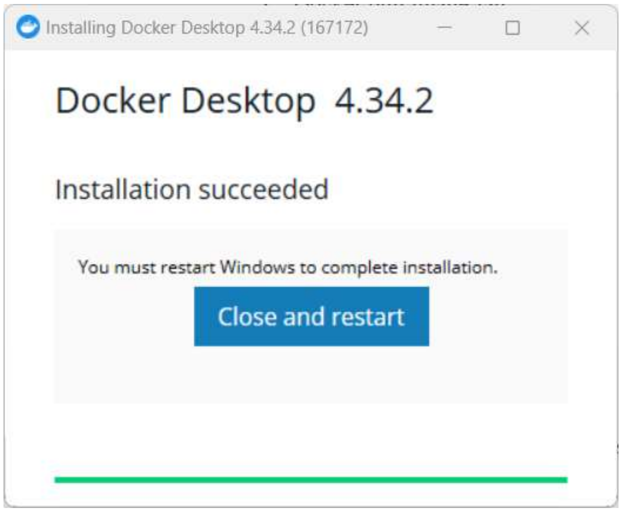


Installing Docker Desktop 4.34.2 (167172)

Docker Desktop 4.34.2

Unpacking files...

```
Unpacking file: resources/Docker desktop.exe
Unpacking file: resources/com.docker.diagnose.exe
Unpacking file: resources/com.docker.dev-envs.exe
Unpacking file: resources/com.docker.build.exe
Unpacking file: resources/com.docker.backend.exe
```

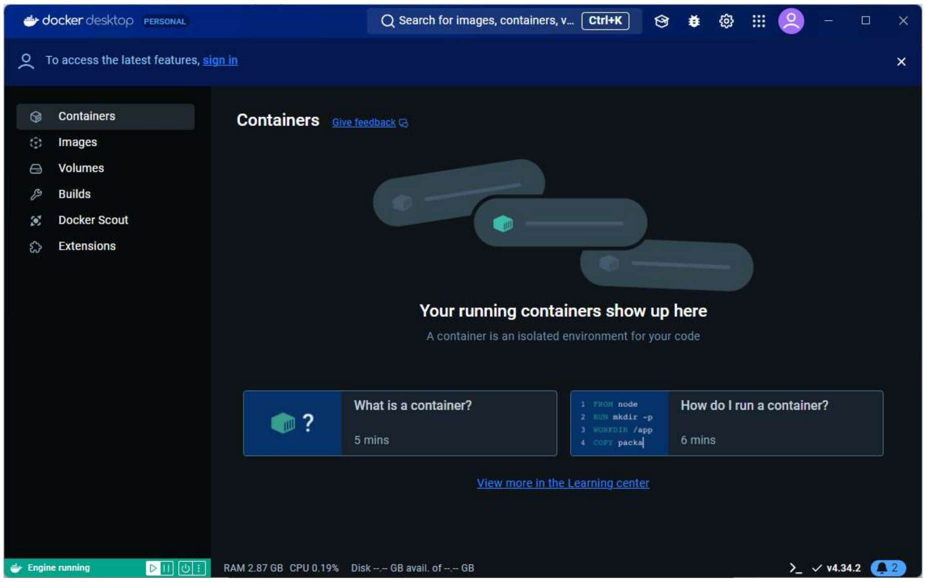


Installing Docker Desktop 4.34.2 (167172)

Docker Desktop 4.34.2

Installation succeeded

You must restart Windows to complete installation.



To access the latest features, sign in

Containers Give feedback

Your running containers show up here

A container is an isolated environment for your code

What is a container?

5 mins

```
FROM node
RUN mkdir -p
WORKDIR /app
COPY packa
```

How do I run a container?

6 mins

View more in the Learning center

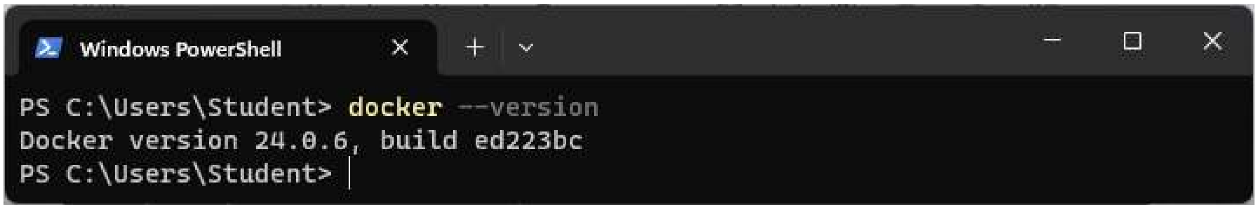
Engine running

RAM 2.87 GB CPU 0.19% Disk --.-- GB avail. of --.-- GB

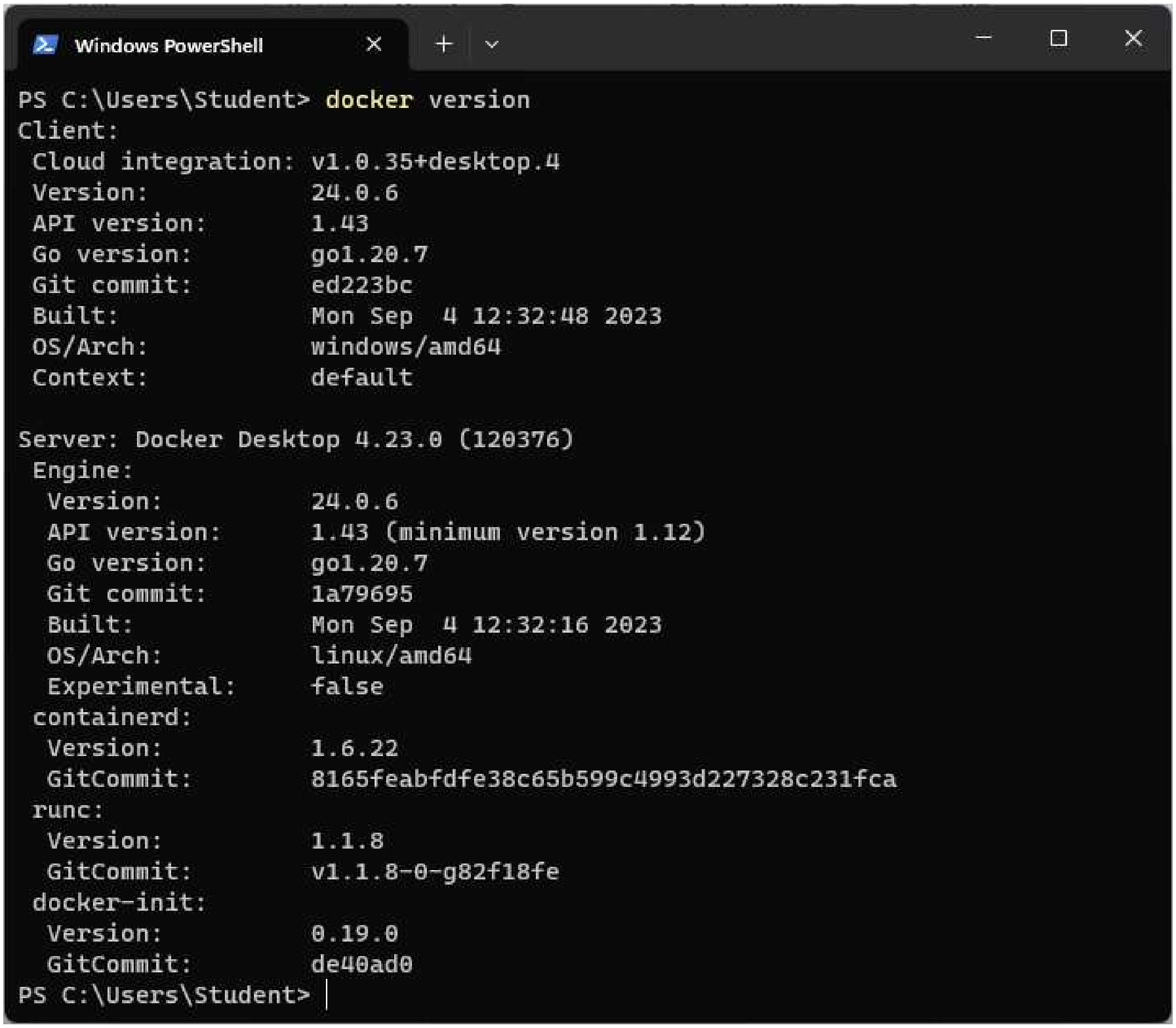
v4.34.2 2

- Execute following docker commands and take screenshots

1. Docker version

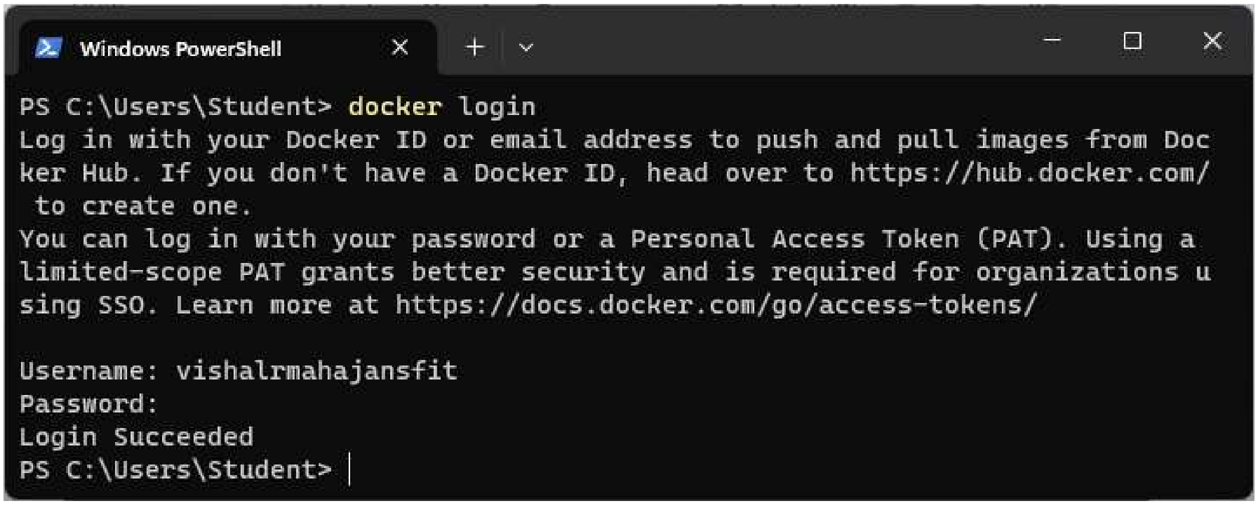


```
PS C:\Users\Student> docker --version
Docker version 24.0.6, build ed223bc
PS C:\Users\Student>
```



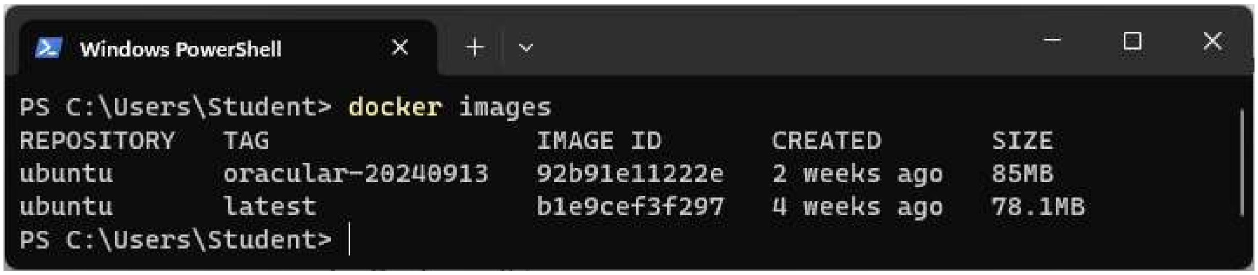
```
PS C:\Users\Student> docker version
Client:
 Cloud integration: v1.0.35+desktop.4
 Version:           24.0.6
 API version:       1.43
 Go version:        go1.20.7
 Git commit:        ed223bc
 Built:             Mon Sep  4 12:32:48 2023
 OS/Arch:           windows/amd64
 Context:           default

Server: Docker Desktop 4.23.0 (120376)
 Engine:
  Version:          24.0.6
  API version:      1.43 (minimum version 1.12)
  Go version:       go1.20.7
  Git commit:       1a79695
  Built:            Mon Sep  4 12:32:16 2023
  OS/Arch:          linux/amd64
  Experimental:     false
 containerd:
  Version:          1.6.22
  GitCommit:        8165feabfdfe38c65b599c4993d227328c231fca
 runc:
  Version:          1.1.8
  GitCommit:        v1.1.8-0-g82f18fe
 docker-init:
  Version:          0.19.0
  GitCommit:        de40ad0
PS C:\Users\Student>
```

2. Docker login



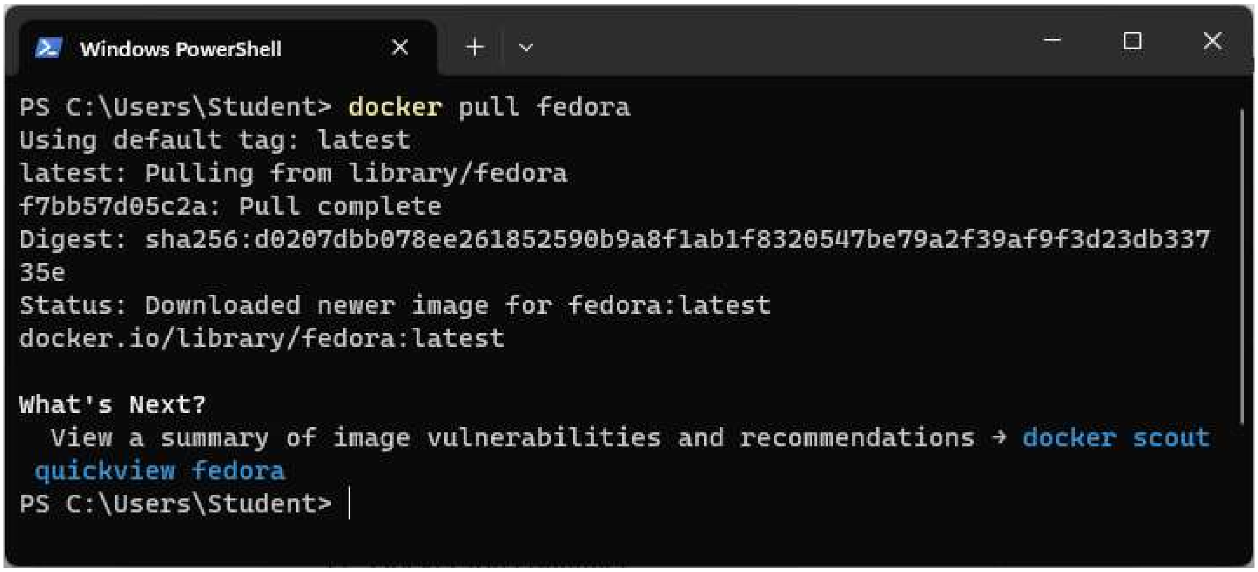
```
PS C:\Users\Student> docker login
Log in with your Docker ID or email address to push and pull images from Doc
ker Hub. If you don't have a Docker ID, head over to https://hub.docker.com/
 to create one.
You can log in with your password or a Personal Access Token (PAT). Using a
limited-scope PAT grants better security and is required for organizations u
sing SSO. Learn more at https://docs.docker.com/go/access-tokens/

Username: vishalrmahajansfit
Password:
Login Succeeded
PS C:\Users\Student>
```

3. Docker images



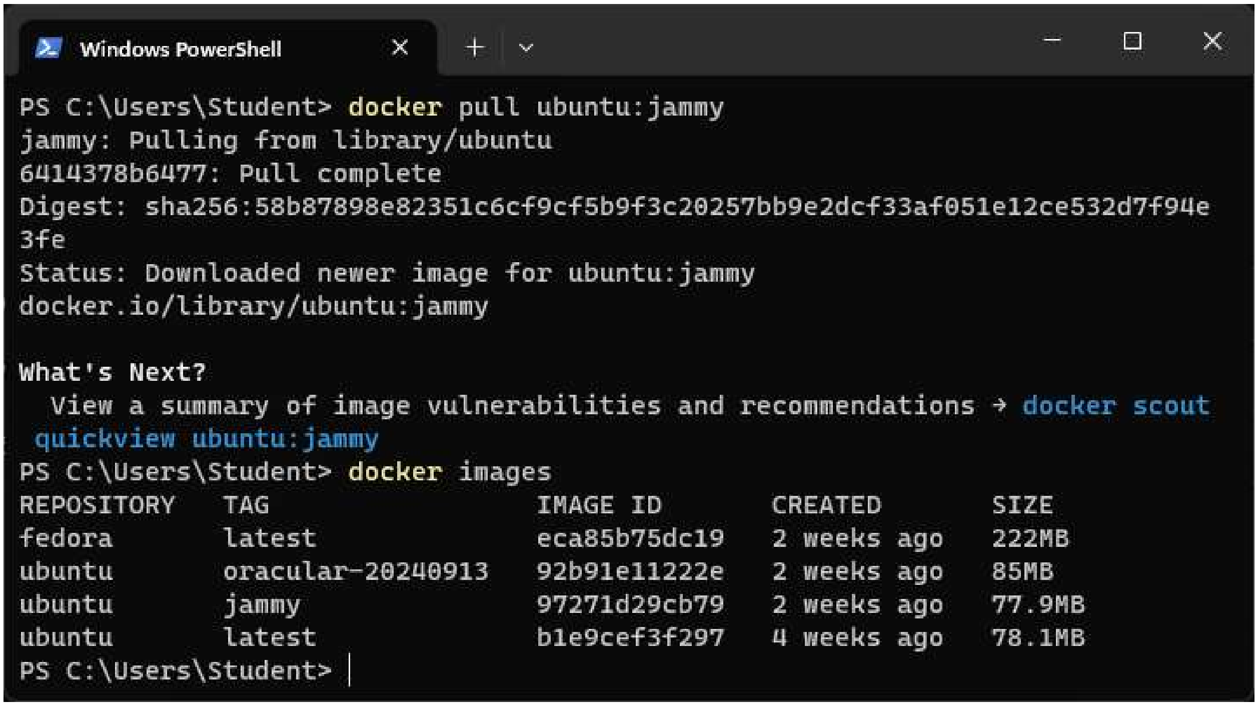
```
PS C:\Users\Student> docker images
REPOSITORY   TAG                  IMAGE ID       CREATED       SIZE
ubuntu       oracular-20240913    92b91e11222e   2 weeks ago   85MB
ubuntu       latest               b1e9cef3f297   4 weeks ago   78.1MB
PS C:\Users\Student>
```

4. Docker pull image



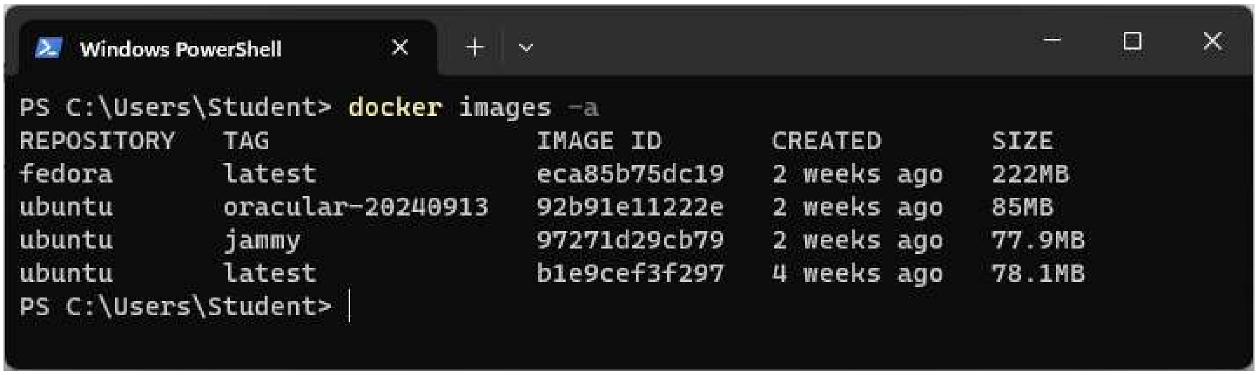
```
PS C:\Users\Student> docker pull fedora
Using default tag: latest
latest: Pulling from library/fedora
f7bb57d05c2a: Pull complete
Digest: sha256:d0207dbb078ee261852590b9a8f1ab1f8320547be79a2f39af9f3d23db337
35e
Status: Downloaded newer image for fedora:latest
docker.io/library/fedora:latest

What's Next?
  View a summary of image vulnerabilities and recommendations → docker scout
 quickview fedora
PS C:\Users\Student>
```

5. Docker pull image-tag

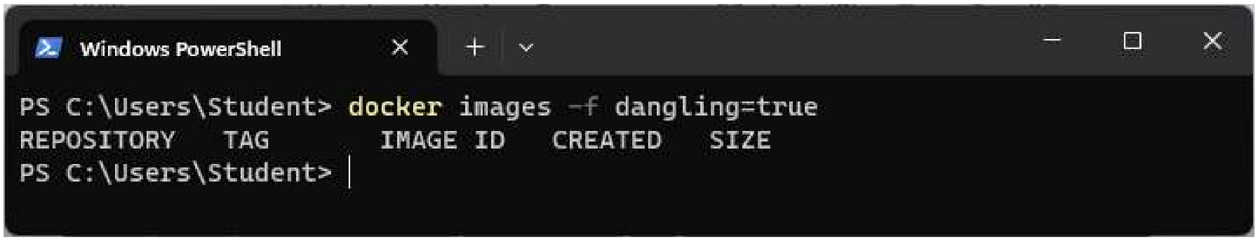


```
PS C:\Users\Student> docker pull ubuntu:jammy
jammy: Pulling from library/ubuntu
6414378b6477: Pull complete
Digest: sha256:58b87898e82351c6cf9cf5b9f3c20257bb9e2dcf33af051e12ce532d7f94e
3fe
Status: Downloaded newer image for ubuntu:jammy
docker.io/library/ubuntu:jammy

What's Next?
  View a summary of image vulnerabilities and recommendations → docker scout
 quickview ubuntu:jammy
PS C:\Users\Student> docker images
REPOSITORY   TAG                 IMAGE ID       CREATED        SIZE
fedora       latest              eca85b75dc19   2 weeks ago    222MB
ubuntu       oracular-20240913   92b91e11222e   2 weeks ago    85MB
ubuntu       jammy               97271d29cb79   2 weeks ago    77.9MB
ubuntu       latest              b1e9cef3f297   4 weeks ago    78.1MB
PS C:\Users\Student>
```

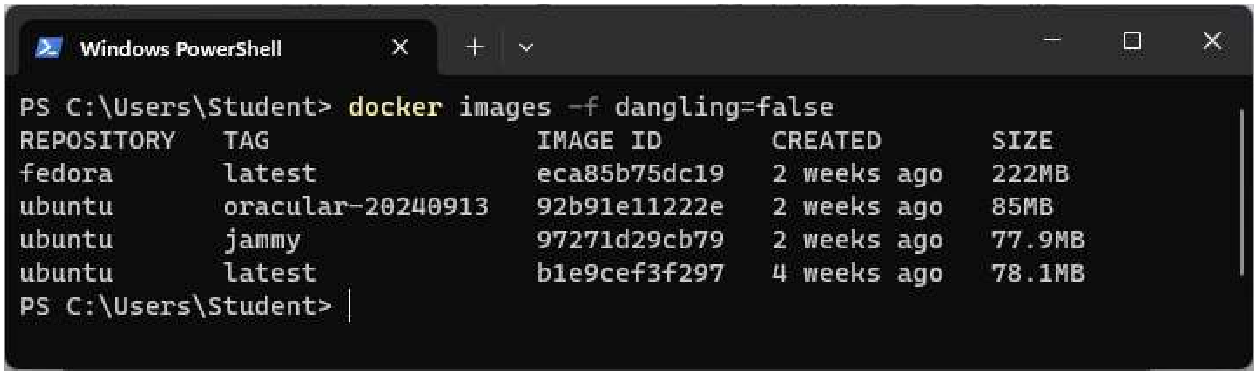
6. Docker images help



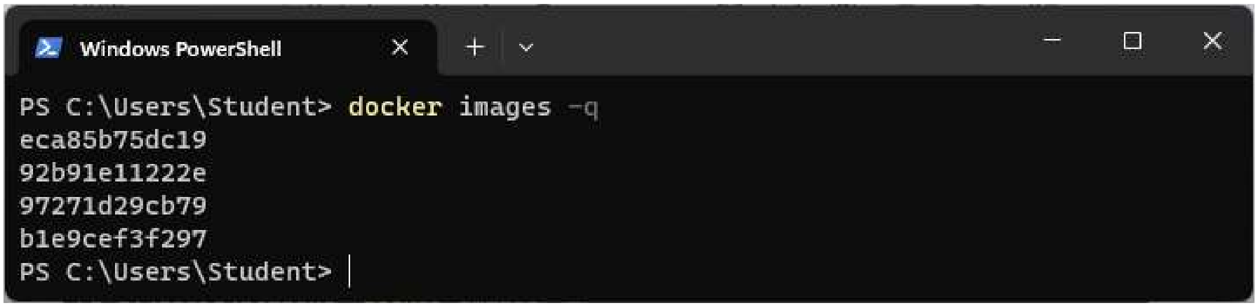
```
PS C:\Users\Student> docker images -a
REPOSITORY   TAG                 IMAGE ID       CREATED        SIZE
fedora       latest              eca85b75dc19   2 weeks ago    222MB
ubuntu       oracular-20240913   92b91e11222e   2 weeks ago    85MB
ubuntu       jammy               97271d29cb79   2 weeks ago    77.9MB
ubuntu       latest              b1e9cef3f297   4 weeks ago    78.1MB
PS C:\Users\Student>
```



```
PS C:\Users\Student> docker images -f dangling=true
REPOSITORY   TAG       IMAGE ID   CREATED   SIZE
PS C:\Users\Student>
```

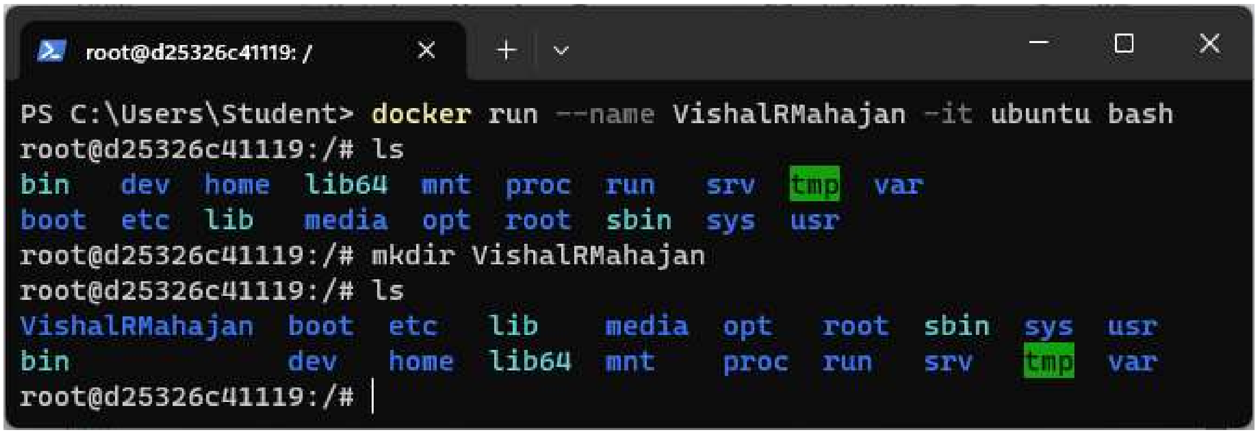


```
PS C:\Users\Student> docker images -f dangling=false
REPOSITORY   TAG                   IMAGE ID       CREATED       SIZE
fedora       latest                eca85b75dc19   2 weeks ago   222MB
ubuntu       oracular-20240913     92b91e11222e   2 weeks ago   85MB
ubuntu       jammy                 97271d29cb79   2 weeks ago   77.9MB
ubuntu       latest                b1e9cef3f297   4 weeks ago   78.1MB
PS C:\Users\Student>
```



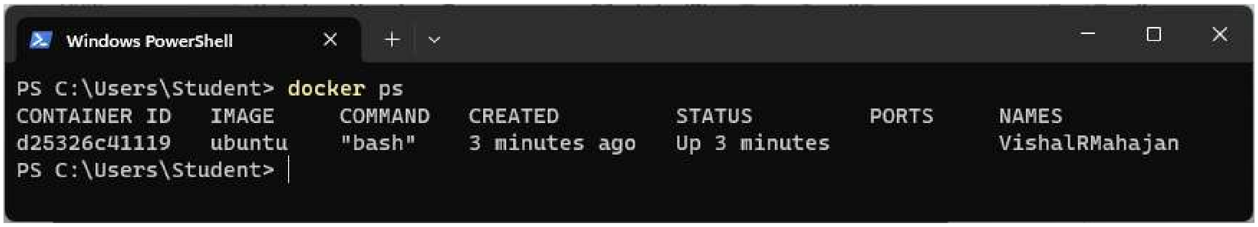
```
PS C:\Users\Student> docker images -q
eca85b75dc19
92b91e11222e
97271d29cb79
b1e9cef3f297
PS C:\Users\Student>
```

7. Docker run commands

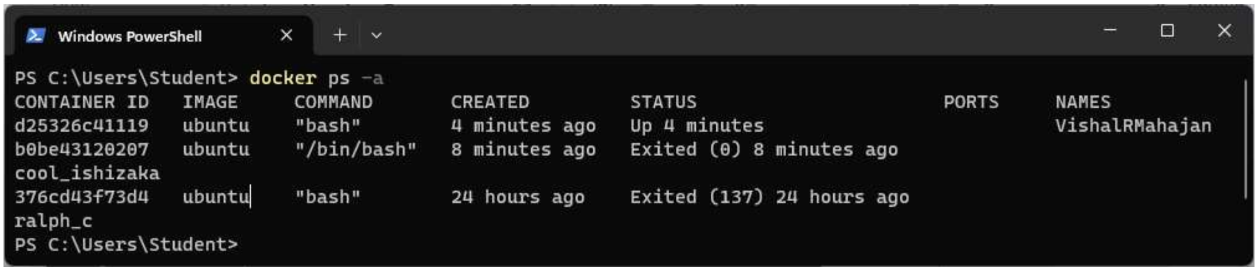


```
PS C:\Users\Student> docker run --name VishalRMahajan -it ubuntu bash
root@d25326c41119:/# ls
bin   dev  home  lib64  mnt  proc  run   srv  tmp  var
boot  etc  lib   media  opt  root  sbin  sys  usr
root@d25326c41119:/# mkdir VishalRMahajan
root@d25326c41119:/# ls
VishalRMahajan  boot  etc   lib    media  opt   root  sbin  sys  usr
bin             dev   home  lib64  mnt    proc  run   srv   tmp  var
root@d25326c41119:/#
```

8. Docker ps

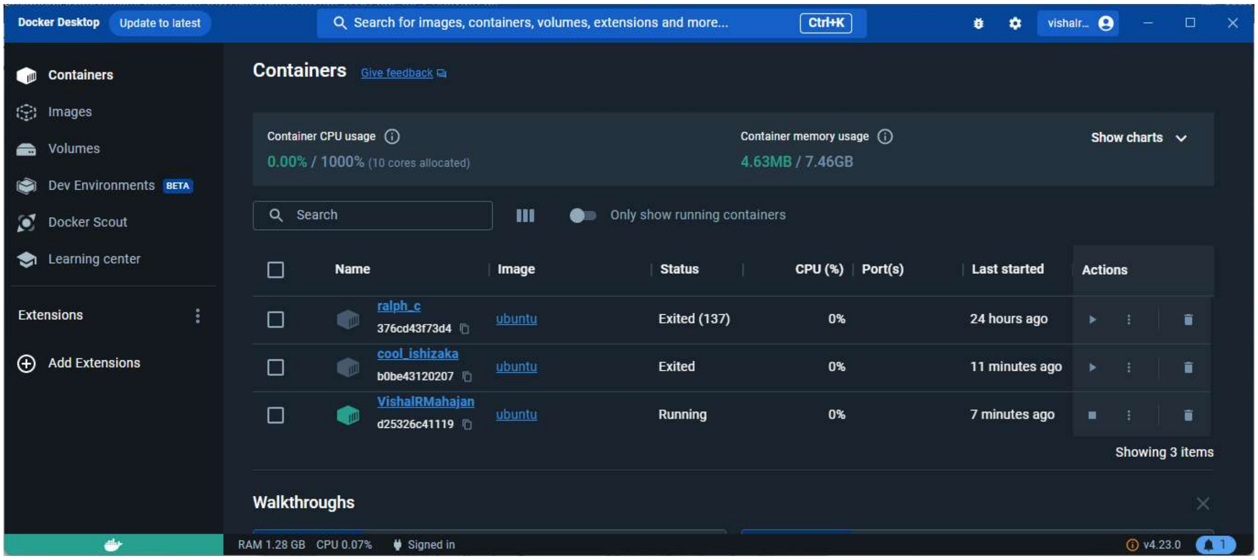


```
PS C:\Users\Student> docker ps
CONTAINER ID   IMAGE    COMMAND   CREATED         STATUS         PORTS     NAMES
d25326c41119   ubuntu   "bash"    3 minutes ago   Up 3 minutes             VishalRMahajan
PS C:\Users\Student>
```



```
PS C:\Users\Student> docker ps -a
CONTAINER ID   IMAGE     COMMAND       CREATED          STATUS                       PORTS     NAMES
d25326c41119   ubuntu    "bash"        4 minutes ago    Up 4 minutes                           VishalRMahajan
b0be43120207   ubuntu    "/bin/bash"   8 minutes ago    Exited (0) 8 minutes ago
cool_ishizaka
376cd43f73d4   ubuntu    "bash"        24 hours ago     Exited (137) 24 hours ago
ralph_c
PS C:\Users\Student>
```

9. Docker pause container



Containers

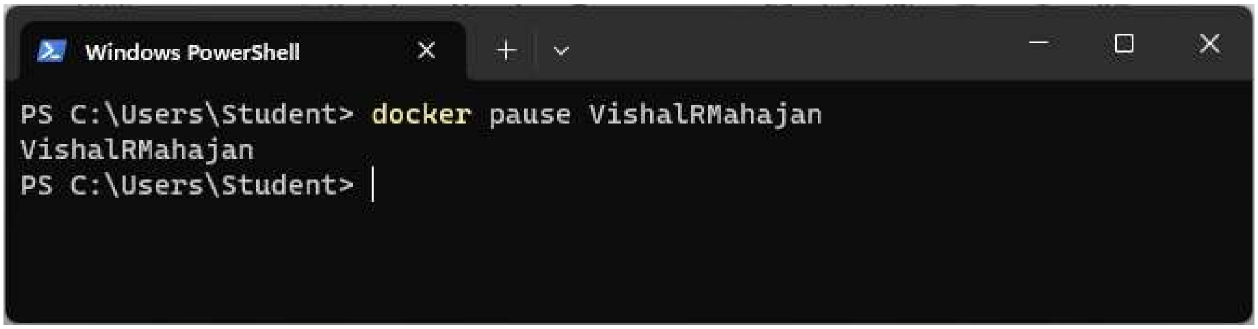
Container CPU usage 0.00% / 1000% (10 cores allocated)

Container memory usage 4.63MB / 7.46GB

Only show running containers

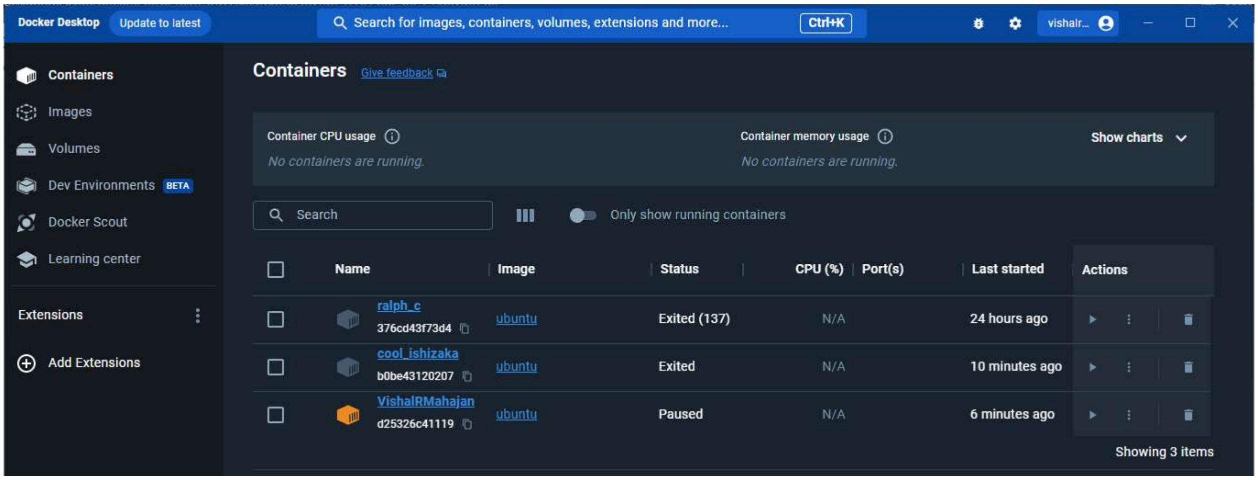
Name	Image	Status	CPU (%)	Port(s)	Last started	Actions
ralph_c 376cd43f73d4	ubuntu	Exited (137)	0%		24 hours ago	
cool_ishizaka b0be43120207	ubuntu	Exited	0%		11 minutes ago	
VishalRMahajan d25326c41119	ubuntu	Running	0%		7 minutes ago	

Showing 3 items



```
PS C:\Users\Student> docker pause VishalRMahajan
VishalRMahajan
PS C:\Users\Student>
```

10. Docker unpause container



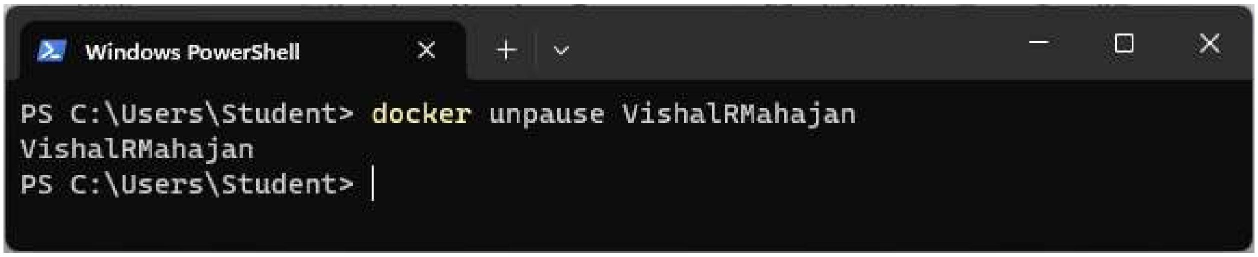
Containers

Container CPU usage
No containers are running.

Container memory usage
No containers are running.

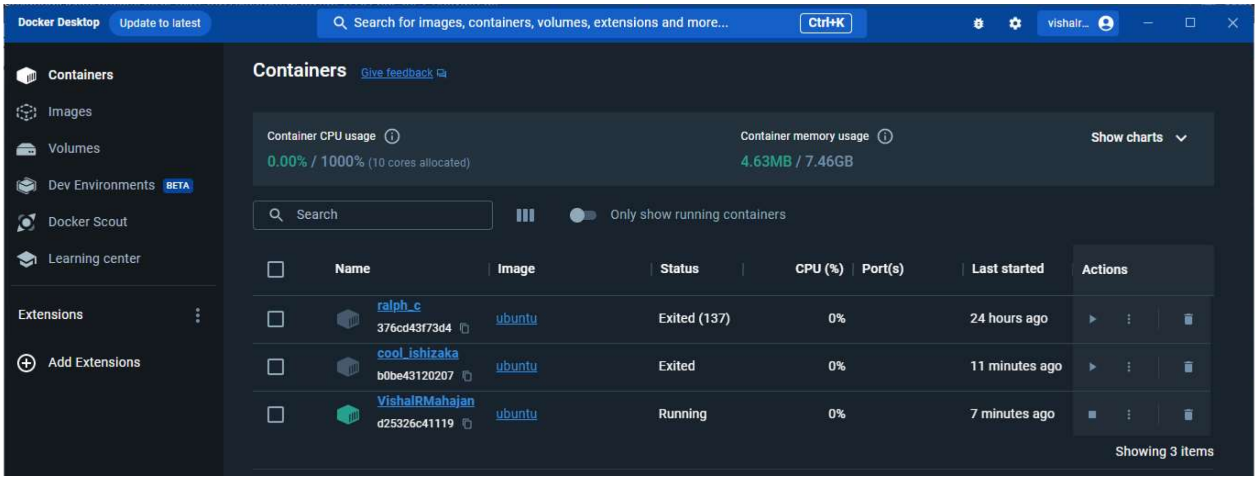
□	Name	Image	Status	CPU (%)	Port(s)	Last started	Actions
□	ralph_c 376cd43f73d4	ubuntu	Exited (137)	N/A		24 hours ago	
□	cool_ishizaka b0be43120207	ubuntu	Exited	N/A		10 minutes ago	
□	VishalRMahajan d25326c41119	ubuntu	Paused	N/A		6 minutes ago	

Showing 3 items



```
PS C:\Users\Student> docker unpause VishalRMahajan
VishalRMahajan
PS C:\Users\Student>
```

11. Docker stop container



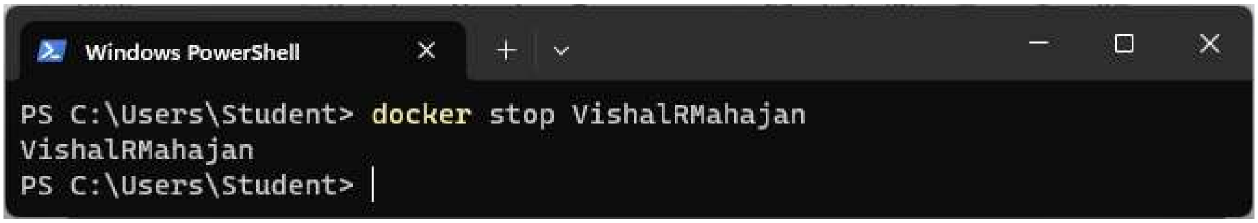
Containers

Container CPU usage
0.00% / 1000% (10 cores allocated)

Container memory usage
4.63MB / 7.46GB

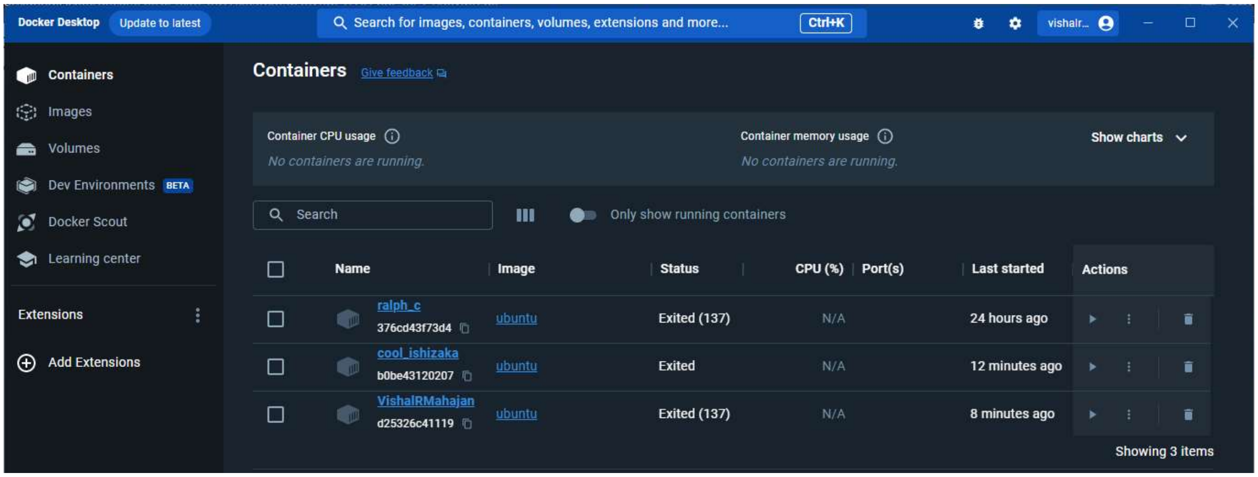
□	Name	Image	Status	CPU (%)	Port(s)	Last started	Actions
□	ralph_c 376cd43f73d4	ubuntu	Exited (137)	0%		24 hours ago	
□	cool_ishizaka b0be43120207	ubuntu	Exited	0%		11 minutes ago	
□	VishalRMahajan d25326c41119	ubuntu	Running	0%		7 minutes ago	

Showing 3 items



```
PS C:\Users\Student> docker stop VishalRMahajan
VishalRMahajan
PS C:\Users\Student>
```

12. Docker start container



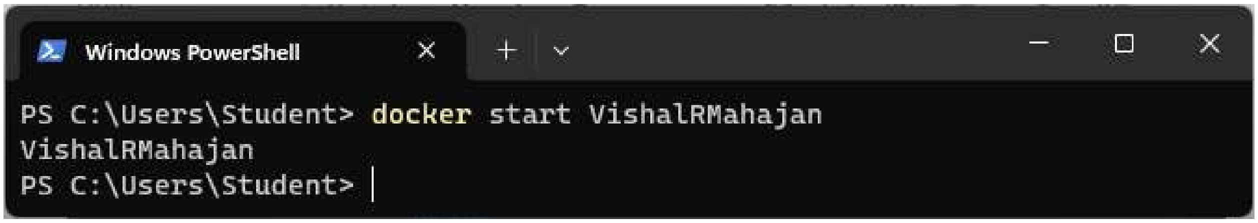
Containers

Container CPU usage
No containers are running.

Container memory usage
No containers are running.

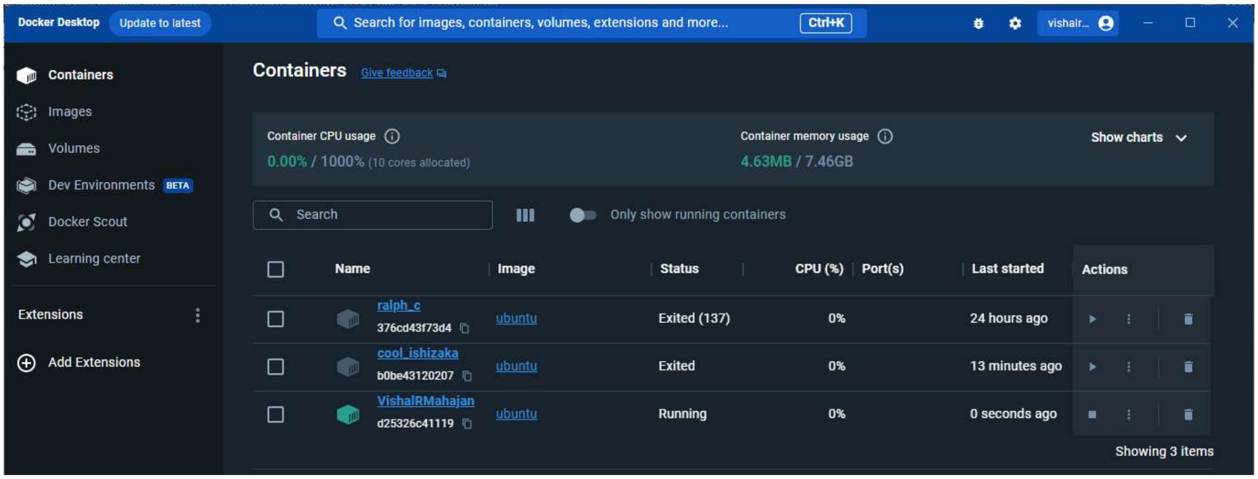
☐	Name	Image	Status	CPU (%)	Port(s)	Last started	Actions
☐	ralph_c 376cd43f73d4	ubuntu	Exited (137)	N/A		24 hours ago	▶ ⋮ 🗑
☐	cool_ishizaka b0be43120207	ubuntu	Exited	N/A		12 minutes ago	▶ ⋮ 🗑
☐	VishalRMahajan d25326c41119	ubuntu	Exited (137)	N/A		8 minutes ago	▶ ⋮ 🗑

Showing 3 items



```
PS C:\Users\Student> docker start VishalRMahajan
VishalRMahajan
PS C:\Users\Student> |
```

13. Docker top container



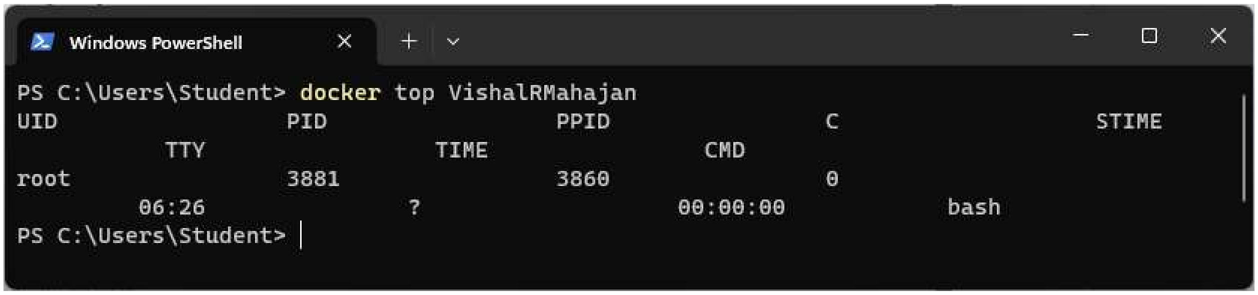
Containers

Container CPU usage
0.00% / 1000% (10 cores allocated)

Container memory usage
4.63MB / 7.46GB

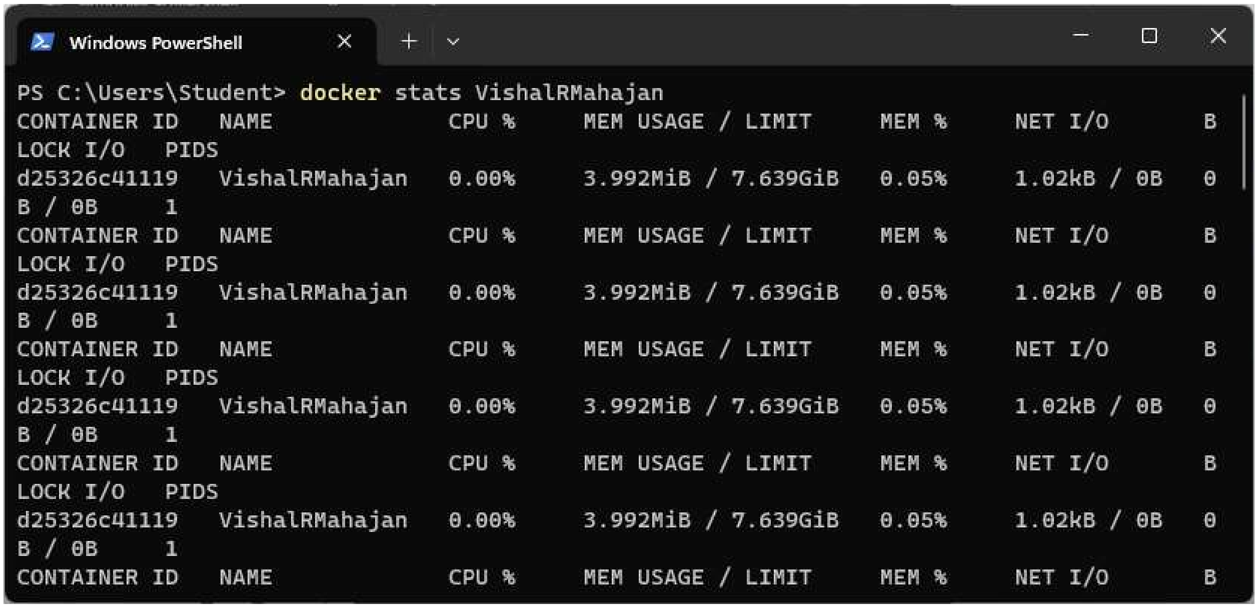
☐	Name	Image	Status	CPU (%)	Port(s)	Last started	Actions
☐	ralph_c 376cd43f73d4	ubuntu	Exited (137)	0%		24 hours ago	▶ ⋮ 🗑
☐	cool_ishizaka b0be43120207	ubuntu	Exited	0%		13 minutes ago	▶ ⋮ 🗑
☐	VishalRMahajan d25326c41119	ubuntu	Running	0%		0 seconds ago	■ ⋮ 🗑

Showing 3 items



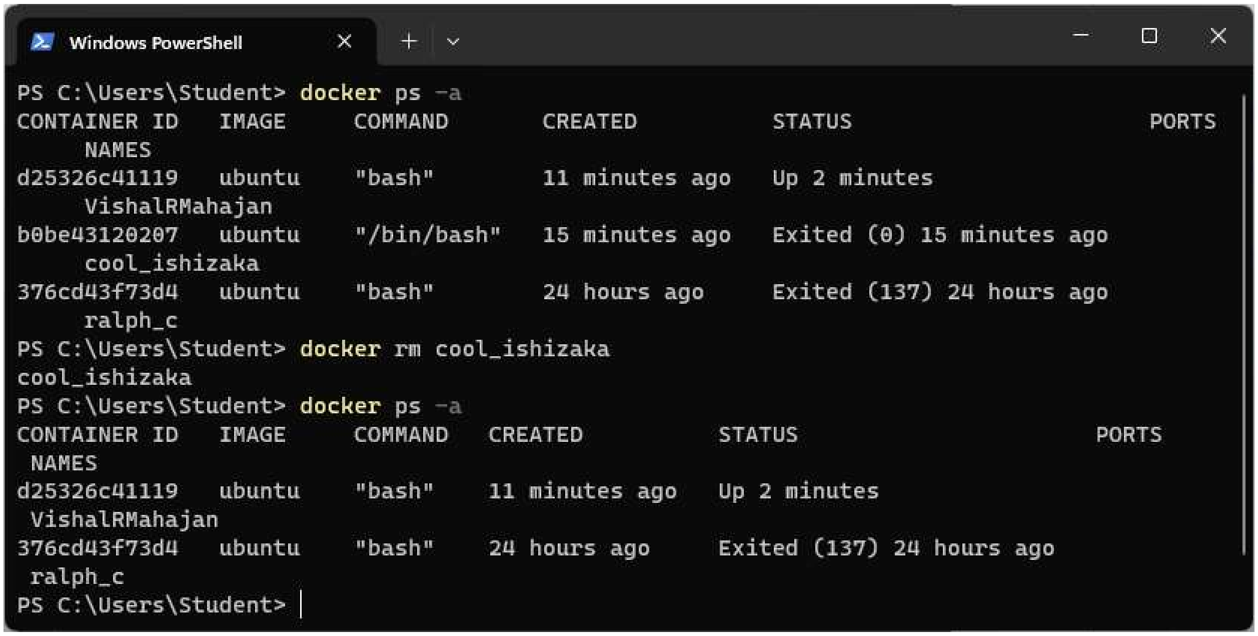
```
PS C:\Users\Student> docker top VishalRMahajan
UID                 PID                 PPID                C                   STIME
           TTY                 TIME                CMD
root                3881                3860                0
         06:26               ?                   00:00:00            bash
PS C:\Users\Student> |
```

14. Docker stats container



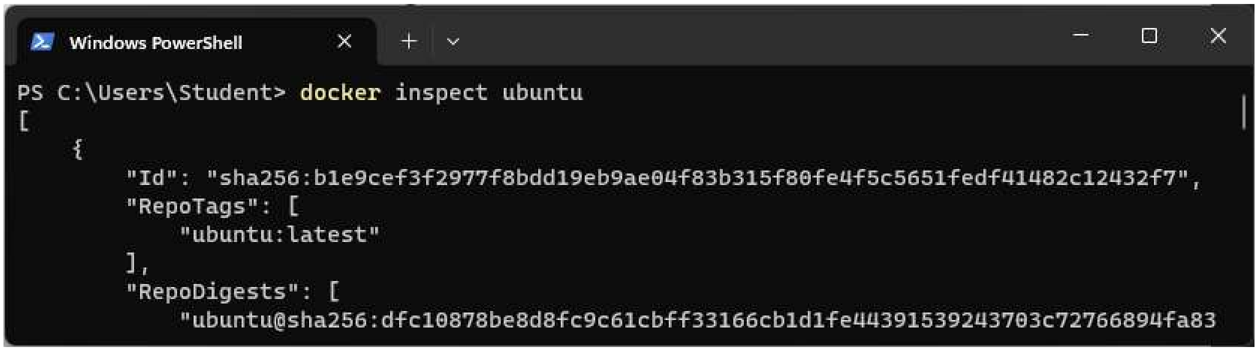
```
PS C:\Users\Student> docker stats VishalRMahajan
CONTAINER ID   NAME             CPU %     MEM USAGE / LIMIT     MEM %     NET I/O         B
LOCK I/O   PIDS
d25326c41119   VishalRMahajan   0.00%     3.992MiB / 7.639GiB   0.05%     1.02kB / 0B     0
B / 0B      1
CONTAINER ID   NAME             CPU %     MEM USAGE / LIMIT     MEM %     NET I/O         B
LOCK I/O   PIDS
d25326c41119   VishalRMahajan   0.00%     3.992MiB / 7.639GiB   0.05%     1.02kB / 0B     0
B / 0B      1
CONTAINER ID   NAME             CPU %     MEM USAGE / LIMIT     MEM %     NET I/O         B
LOCK I/O   PIDS
d25326c41119   VishalRMahajan   0.00%     3.992MiB / 7.639GiB   0.05%     1.02kB / 0B     0
B / 0B      1
CONTAINER ID   NAME             CPU %     MEM USAGE / LIMIT     MEM %     NET I/O         B
LOCK I/O   PIDS
d25326c41119   VishalRMahajan   0.00%     3.992MiB / 7.639GiB   0.05%     1.02kB / 0B     0
B / 0B      1
CONTAINER ID   NAME             CPU %     MEM USAGE / LIMIT     MEM %     NET I/O         B
```

15. Docker rm container

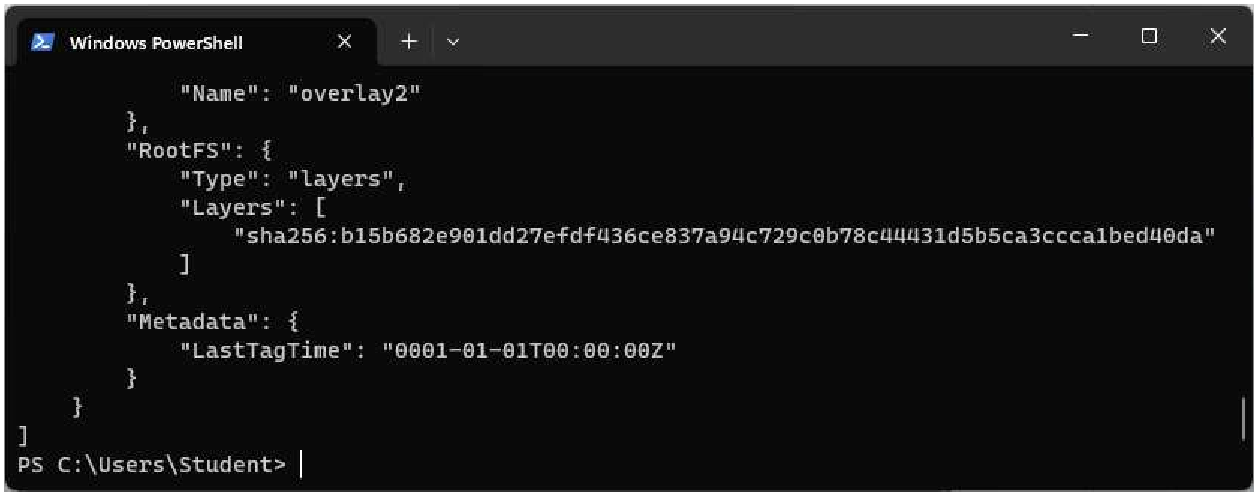


```
PS C:\Users\Student> docker ps -a
CONTAINER ID   IMAGE     COMMAND       CREATED          STATUS                       PORTS
     NAMES
d25326c41119   ubuntu    "bash"        11 minutes ago   Up 2 minutes
     VishalRMahajan
b0be43120207   ubuntu    "/bin/bash"   15 minutes ago   Exited (0) 15 minutes ago
     cool_ishizaka
376cd43f73d4   ubuntu    "bash"        24 hours ago     Exited (137) 24 hours ago
     ralph_c
PS C:\Users\Student> docker rm cool_ishizaka
cool_ishizaka
PS C:\Users\Student> docker ps -a
CONTAINER ID   IMAGE     COMMAND   CREATED          STATUS                       PORTS
 NAMES
d25326c41119   ubuntu    "bash"    11 minutes ago   Up 2 minutes
 VishalRMahajan
376cd43f73d4   ubuntu    "bash"    24 hours ago     Exited (137) 24 hours ago
 ralph_c
PS C:\Users\Student> |
```

16.Docker inspect container

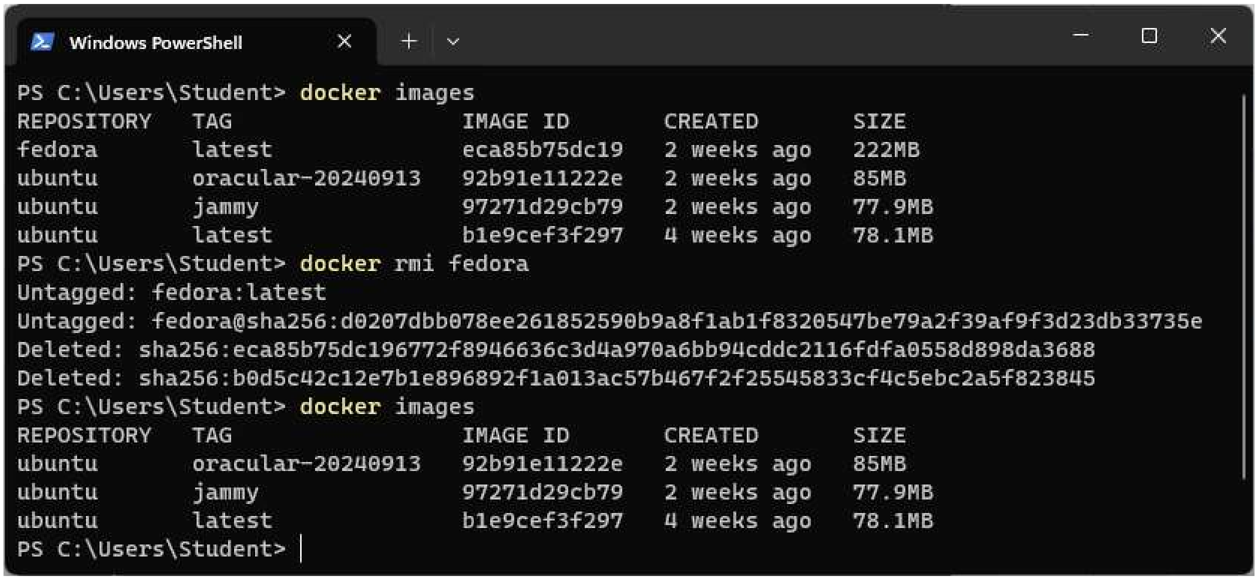


```
PS C:\Users\Student> docker inspect ubuntu
[
    {
        "Id": "sha256:b1e9cef3f2977f8bdd19eb9ae04f83b315f80fe4f5c5651fedf41482c12432f7",
        "RepoTags": [
            "ubuntu:latest"
        ],
        "RepoDigests": [
            "ubuntu@sha256:dfc10878be8d8fc9c61cbff33166cb1d1fe44391539243703c72766894fa83
```



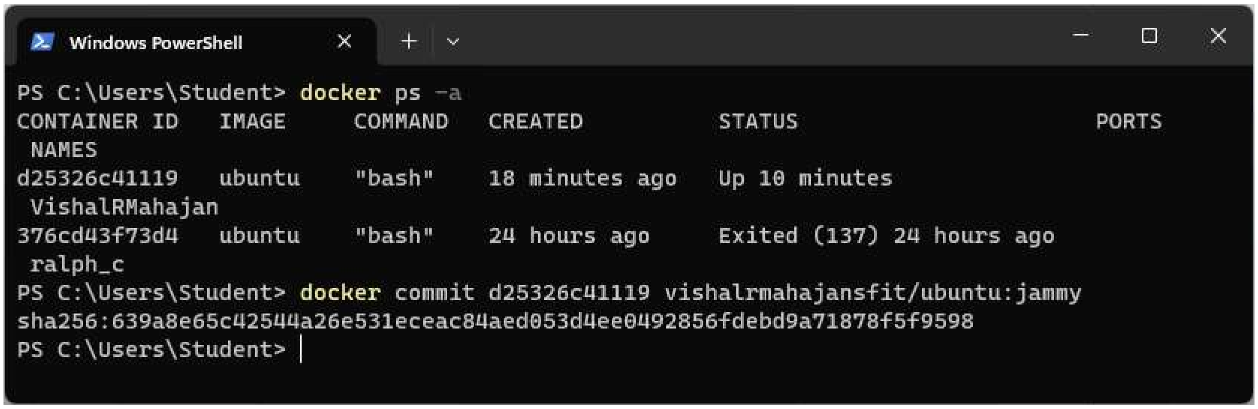
```
            "Name": "overlay2"
        },
        "RootFS": {
            "Type": "layers",
            "Layers": [
                "sha256:b15b682e901dd27efdf436ce837a94c729c0b78c44431d5b5ca3ccca1bed40da"
            ]
        },
        "Metadata": {
            "LastTagTime": "0001-01-01T00:00:00Z"
        }
    }
]
PS C:\Users\Student>
```

17.Docker rmi



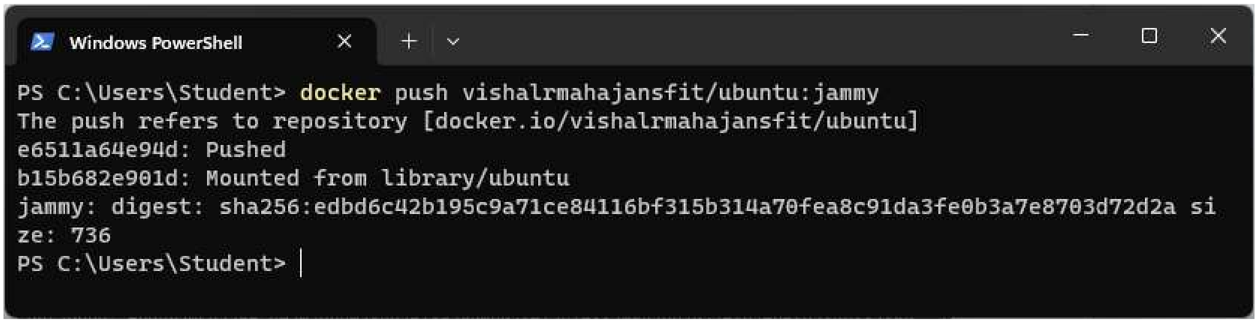
```
PS C:\Users\Student> docker images
REPOSITORY   TAG                 IMAGE ID       CREATED       SIZE
fedora       latest              eca85b75dc19   2 weeks ago   222MB
ubuntu       oracular-20240913   92b91e11222e   2 weeks ago   85MB
ubuntu       jammy               97271d29cb79   2 weeks ago   77.9MB
ubuntu       latest              b1e9cef3f297   4 weeks ago   78.1MB
PS C:\Users\Student> docker rmi fedora
Untagged: fedora:latest
Untagged: fedora@sha256:d0207dbb078ee261852590b9a8f1ab1f8320547be79a2f39af9f3d23db33735e
Deleted: sha256:eca85b75dc196772f8946636c3d4a970a6bb94cddc2116fdfa0558d898da3688
Deleted: sha256:b0d5c42c12e7b1e896892f1a013ac57b467f2f25545833cf4c5ebc2a5f823845
PS C:\Users\Student> docker images
REPOSITORY   TAG                 IMAGE ID       CREATED       SIZE
ubuntu       oracular-20240913   92b91e11222e   2 weeks ago   85MB
ubuntu       jammy               97271d29cb79   2 weeks ago   77.9MB
ubuntu       latest              b1e9cef3f297   4 weeks ago   78.1MB
PS C:\Users\Student>
```

18.Docker commit



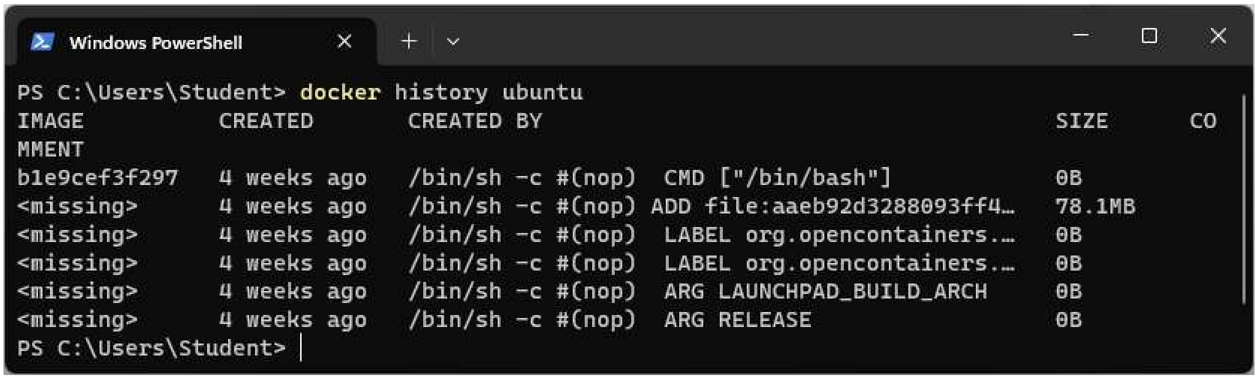
```
PS C:\Users\Student> docker ps -a
CONTAINER ID   IMAGE     COMMAND   CREATED          STATUS                       PORTS
 NAMES
d25326c41119   ubuntu    "bash"    18 minutes ago   Up 10 minutes
 VishalRMahajan
376cd43f73d4   ubuntu    "bash"    24 hours ago     Exited (137) 24 hours ago
 ralph_c
PS C:\Users\Student> docker commit d25326c41119 vishalrmahajansfit/ubuntu:jammy
sha256:639a8e65c42544a26e531eceac84aed053d4ee0492856fdebd9a71878f5f9598
PS C:\Users\Student>
```

19.Docker push



```
PS C:\Users\Student> docker push vishalrmahajansfit/ubuntu:jammy
The push refers to repository [docker.io/vishalrmahajansfit/ubuntu]
e6511a64e94d: Pushed
b15b682e901d: Mounted from library/ubuntu
jammy: digest: sha256:edbd6c42b195c9a71ce84116bf315b314a70fea8c91da3fe0b3a7e8703d72d2a si
ze: 736
PS C:\Users\Student>
```

20. Docker pull image-tag



```
PS C:\Users\Student> docker history ubuntu
IMAGE          CREATED       CREATED BY                                      SIZE      CO
MMENT
b1e9cef3f297   4 weeks ago   /bin/sh -c #(nop)  CMD ["/bin/bash"]            0B
<missing>      4 weeks ago   /bin/sh -c #(nop) ADD file:aaeb92d3288093ff4…   78.1MB
<missing>      4 weeks ago   /bin/sh -c #(nop)  LABEL org.opencontainers.…   0B
<missing>      4 weeks ago   /bin/sh -c #(nop)  LABEL org.opencontainers.…   0B
<missing>      4 weeks ago   /bin/sh -c #(nop)  ARG LAUNCHPAD_BUILD_ARCH     0B
<missing>      4 weeks ago   /bin/sh -c #(nop)  ARG RELEASE                  0B
PS C:\Users\Student>
```

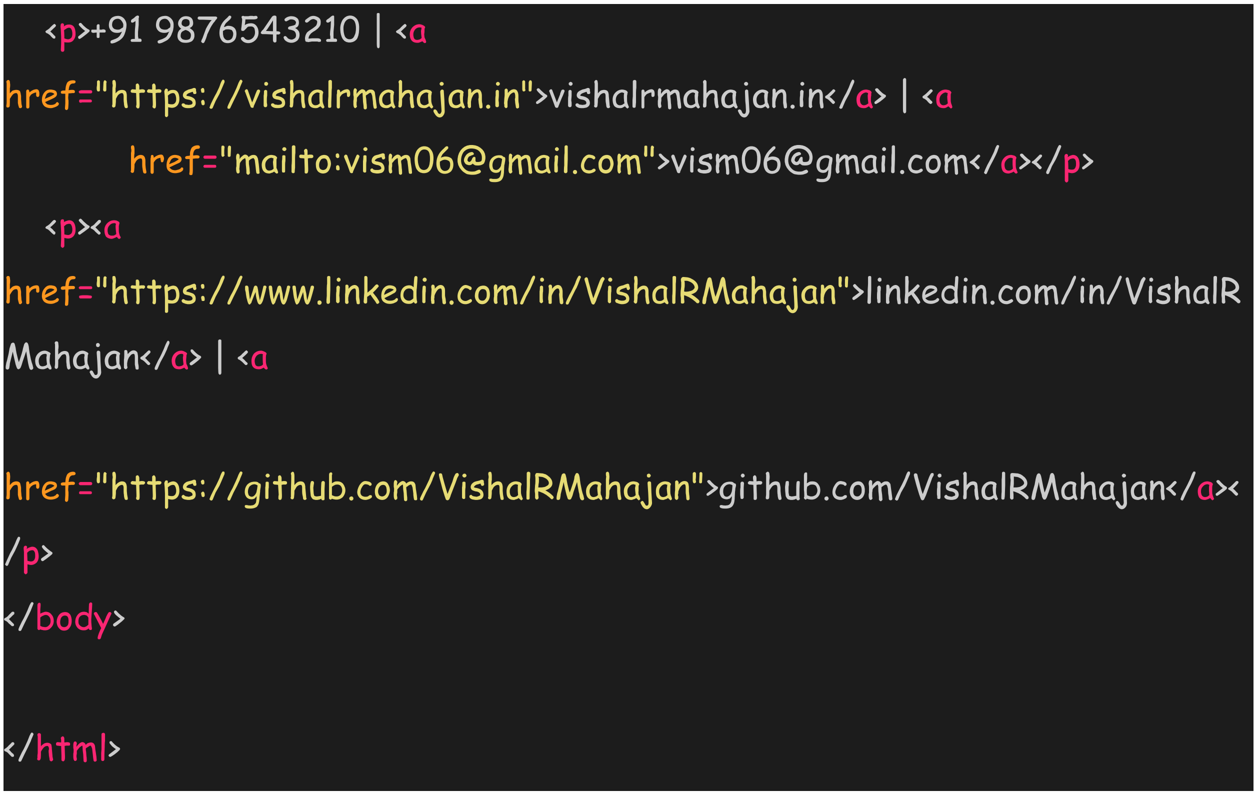
- **Dockerfile and html file**

1) Dockerfile

```
FROM ubuntu:latest
MAINTAINER "Vishal Rajesh Mahajan"
RUN apt update -y
RUN apt install nginx -y
EXPOSE 80
COPY index.html /usr/share/nginx/html/index.html
COPY index.html /var/www/html/index.html
CMD ["nginx","-g","daemon off;"]
```

2) index. html

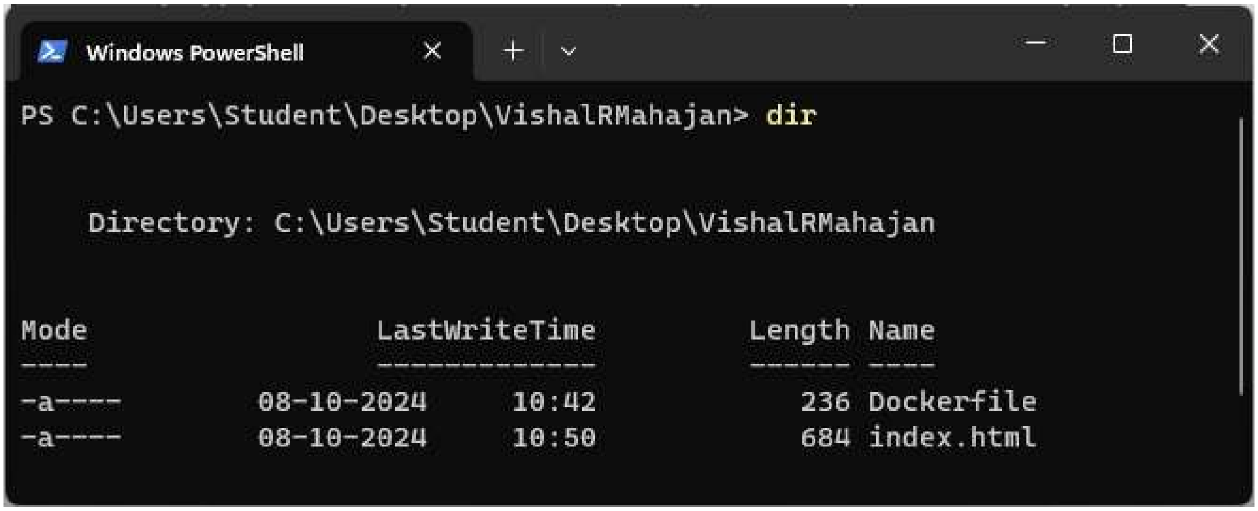
```
<!DOCTYPE html>
<html lang="en">

<head>
   <meta charset="UTF-8">
   <meta name="viewport" content="width=device-width, initial-scale=1.0">
   <title>Vishal Mahajan Resume</title>
   <link rel="stylesheet" href="EXP1.css">
</head>

<body>
   <h1>Vishal Rajesh Mahajan</h1>
   <p>Mumbai, Maharashtra, India (400103)</p>
```



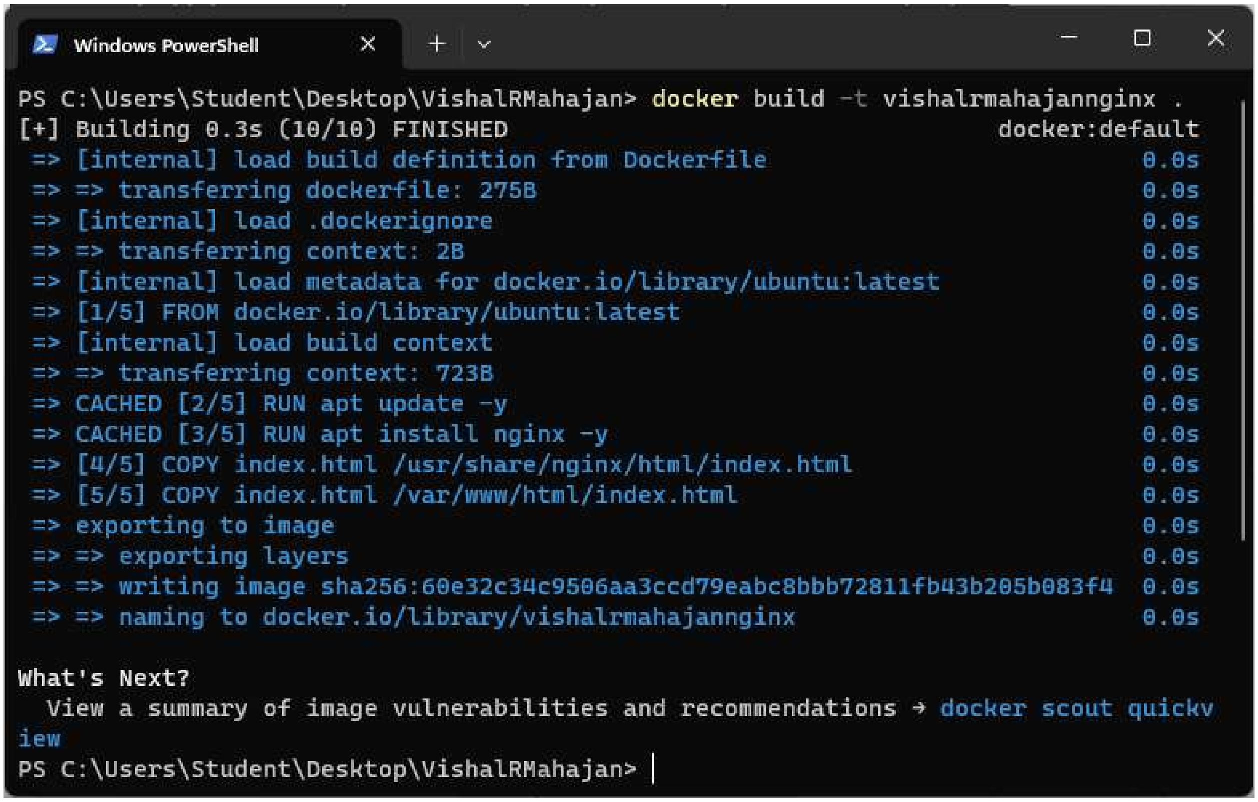
```
  <p>+91 9876543210 | <a
href="https://vishalrmahajan.in">vishalrmahajan.in</a> | <a
        href="mailto:vism06@gmail.com">vism06@gmail.com</a></p>
  <p><a
href="https://www.linkedin.com/in/VishalRMahajan">linkedin.com/in/VishalR
Mahajan</a> | <a

href="https://github.com/VishalRMahajan">github.com/VishalRMahajan</a><
/p>
</body>

</html>
```

- running the web application on Docker Engine

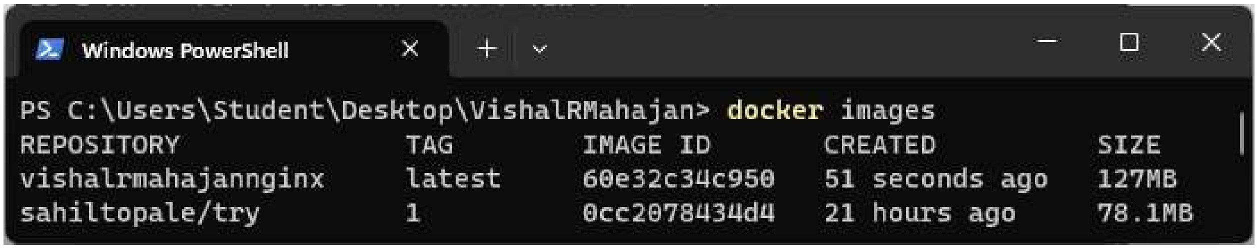
1) Building the image with the name "vishalrmahajannginx". Command: *"Docker -build -t vishalrmahajannginx"*



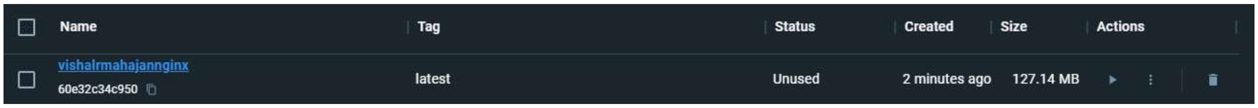
```
PS C:\Users\Student\Desktop\VishalRMahajan> dir


    Directory: C:\Users\Student\Desktop\VishalRMahajan


Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
-a----        08-10-2024     10:42            236 Dockerfile
-a----        08-10-2024     10:50            684 index.html
```



```
PS C:\Users\Student\Desktop\VishalRMahajan> docker build -t vishalrmahajannginx .
[+] Building 0.3s (10/10) FINISHED                                   docker:default
 => [internal] load build definition from Dockerfile                           0.0s
 => => transferring dockerfile: 275B                                           0.0s
 => [internal] load .dockerignore                                              0.0s
 => => transferring context: 2B                                                0.0s
 => [internal] load metadata for docker.io/library/ubuntu:latest               0.0s
 => [1/5] FROM docker.io/library/ubuntu:latest                                 0.0s
 => [internal] load build context                                              0.0s
 => => transferring context: 723B                                              0.0s
 => CACHED [2/5] RUN apt update -y                                             0.0s
 => CACHED [3/5] RUN apt install nginx -y                                      0.0s
 => [4/5] COPY index.html /usr/share/nginx/html/index.html                     0.0s
 => [5/5] COPY index.html /var/www/html/index.html                             0.0s
 => exporting to image                                                         0.0s
 => => exporting layers                                                        0.0s
 => => writing image sha256:60e32c34c9506aa3ccd79eabc8bbb72811fb43b205b083f4   0.0s
 => => naming to docker.io/library/vishalrmahajannginx                         0.0s

What's Next?
  View a summary of image vulnerabilities and recommendations → docker scout quickv
iew
PS C:\Users\Student\Desktop\VishalRMahajan> 
```

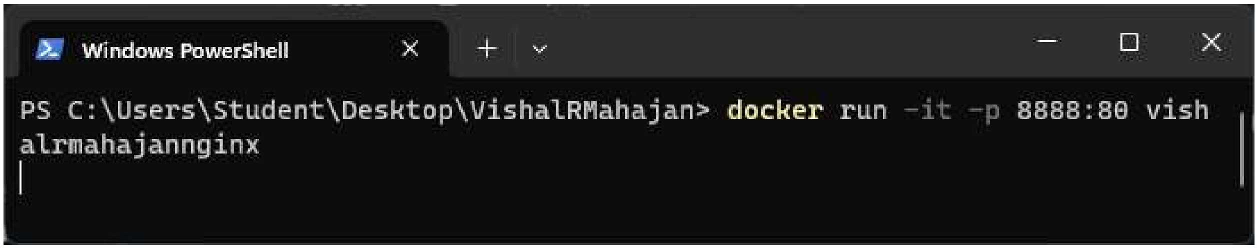


```
PS C:\Users\Student\Desktop\VishalRMahajan> docker images
REPOSITORY            TAG       IMAGE ID       CREATED          SIZE
vishalrmahajannginx   latest    60e32c34c950   51 seconds ago   127MB
sahiltopale/try       1         0cc2078434d4   21 hours ago     78.1MB
```

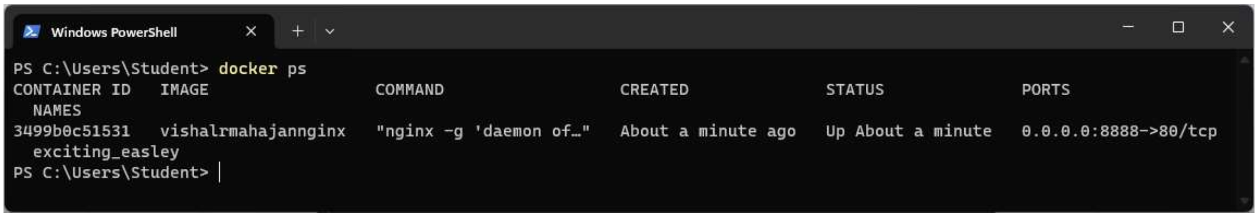


☐	Name	Tag	Status	Created	Size	Actions
☐	vishalrmahajannginx 60e32c34c950	latest	Unused	2 minutes ago	127.14 MB	▶ ⋮ 🗑

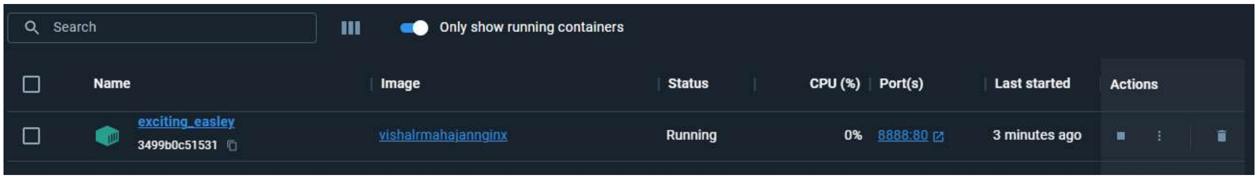
2) Building and running a container from the image "**vishalrmahajannginx**".
Command: ***"docker run -it -p 8888:80 vishalrmahajannginx"***



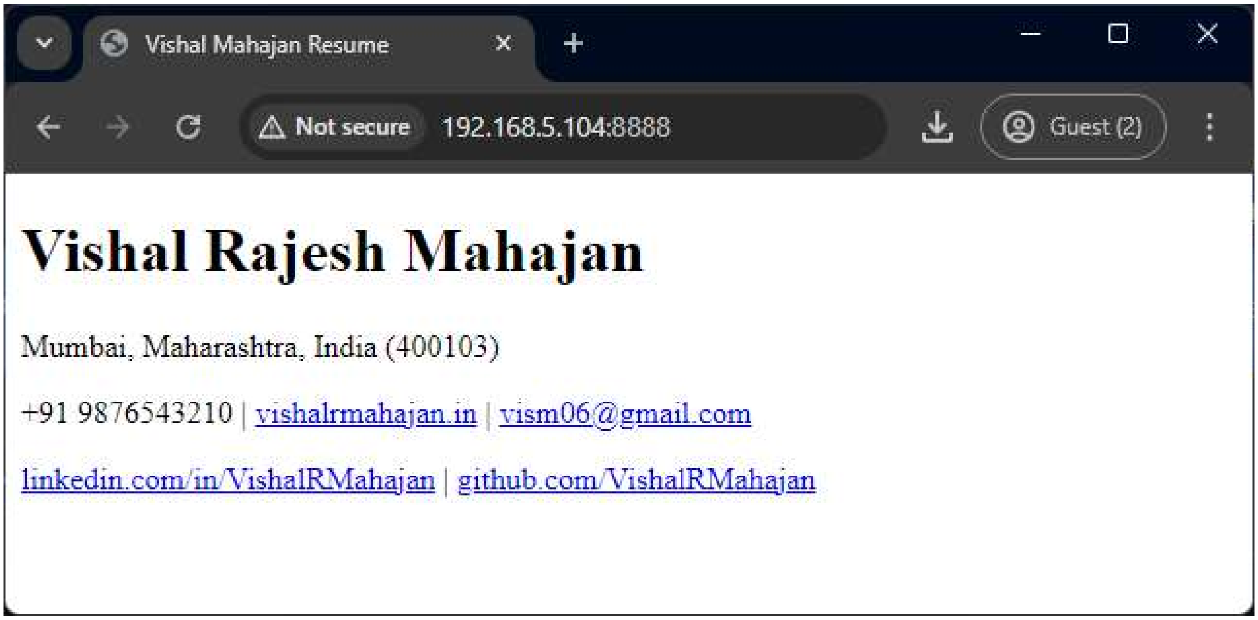
```
PS C:\Users\Student\Desktop\VishalRMahajan> docker run -it -p 8888:80 vish
alrmahajannginx
```



```
PS C:\Users\Student> docker ps
CONTAINER ID   IMAGE                 COMMAND                  CREATED              STATUS              PORTS
  NAMES
3499b0c51531   vishalrmahajannginx   "nginx -g 'daemon of…"   About a minute ago   Up About a minute   0.0.0.0:8888->80/tcp
  exciting_easley
PS C:\Users\Student> |
```



□	Name	Image	Status	CPU (%)	Port(s)	Last started	Actions
□	exciting_easley 3499b0c51531	vishalrmahajannginx	Running	0%	8888:80	3 minutes ago	



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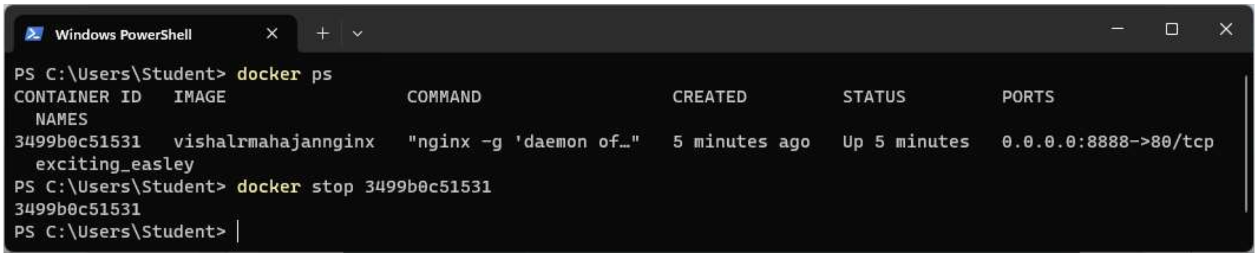
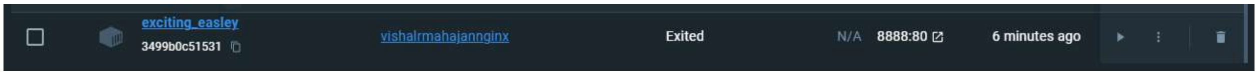
We can see that index.html file is running on Port 8888 of ipv4

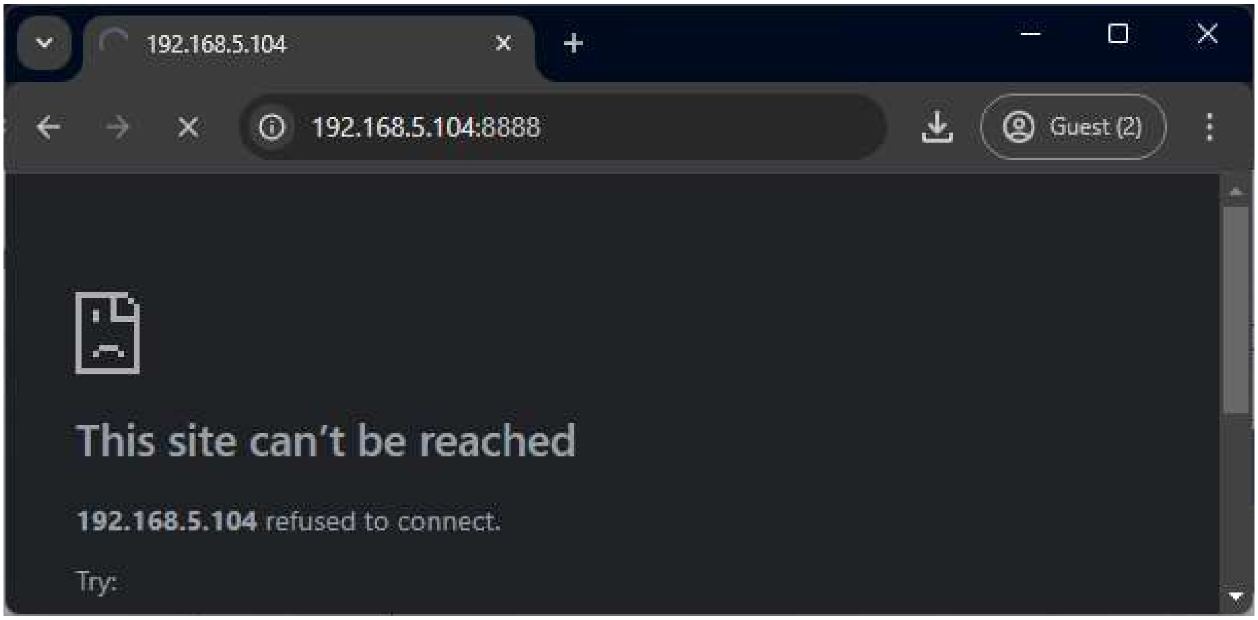
3) Stopping the running container using docker stop <container-id>



```
PS C:\Users\Student> docker ps
CONTAINER ID   IMAGE                 COMMAND                  CREATED         STATUS         PORTS
  NAMES
3499b0c51531   vishalrmahajannginx   "nginx -g 'daemon of…"   5 minutes ago   Up 5 minutes   0.0.0.0:8888->80/tcp
  exciting_easley
PS C:\Users\Student> docker stop 3499b0c51531
3499b0c51531
PS C:\Users\Student> |
```



□	exciting_easley 3499b0c51531	vishalrmahajannginx	Exited	N/A	8888:80	6 minutes ago

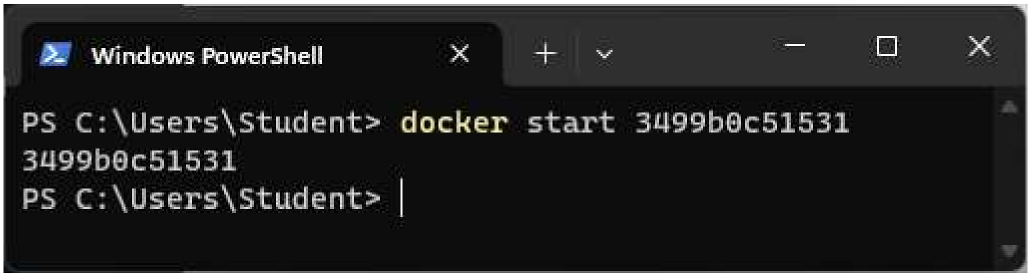


This site can't be reached

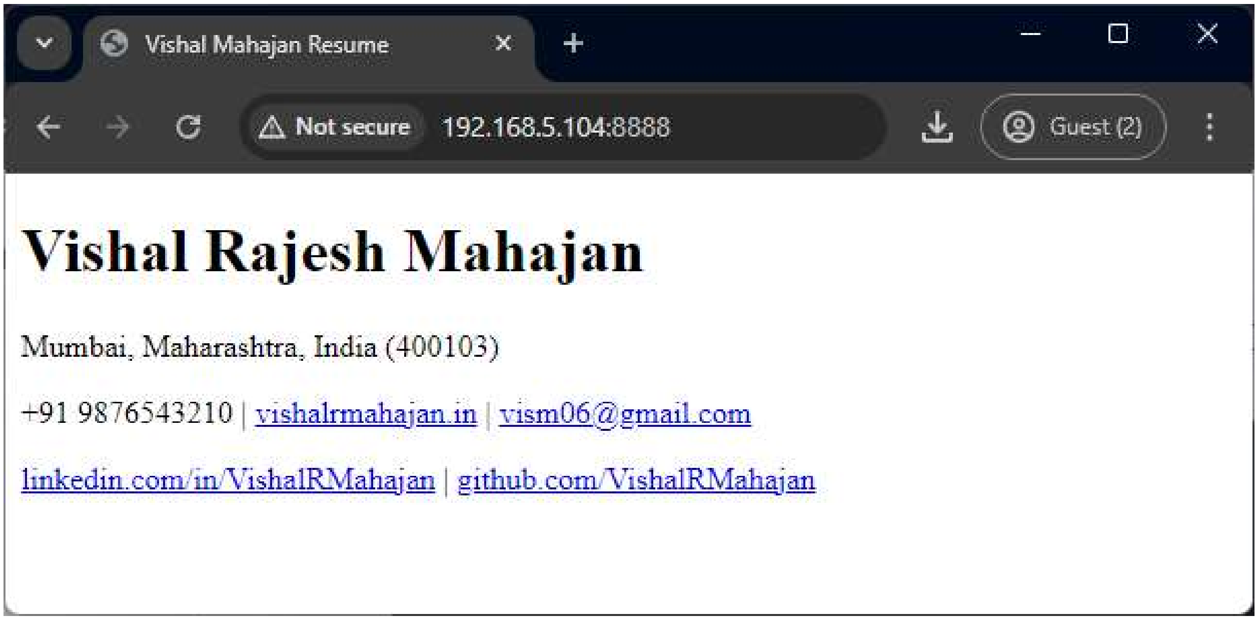
192.168.5.104 refused to connect.

Try:

4) **Starting the running container using docker start <container-id>**



```
PS C:\Users\Student> docker start 3499b0c51531
3499b0c51531
PS C:\Users\Student>
```



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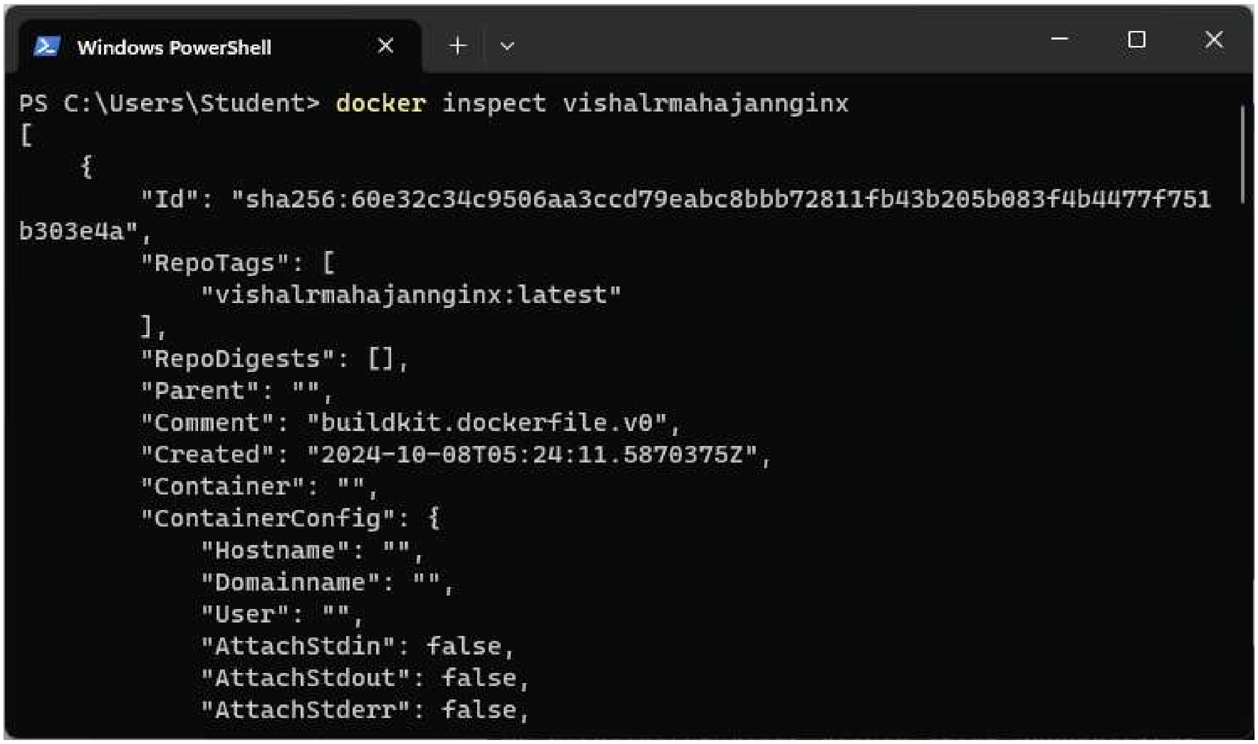
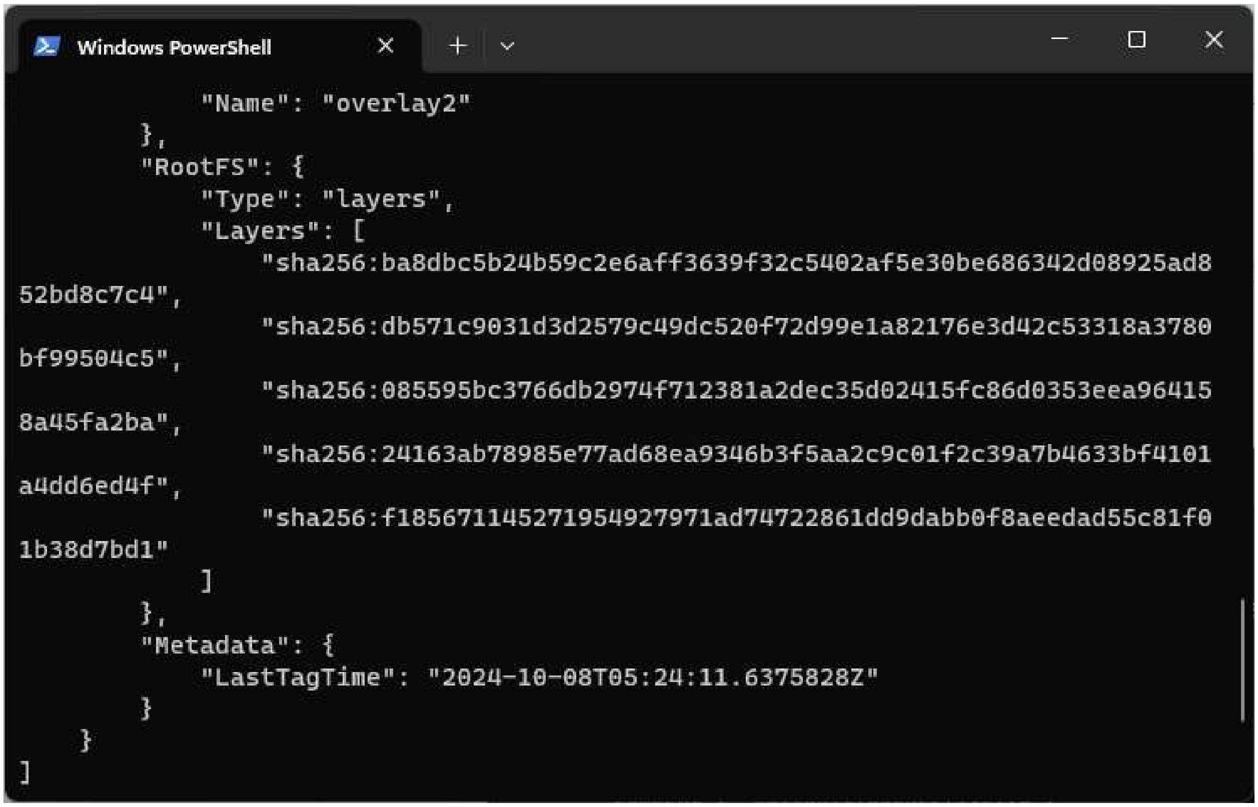
5) Retrieving detailed information about docker objects using docker inspect

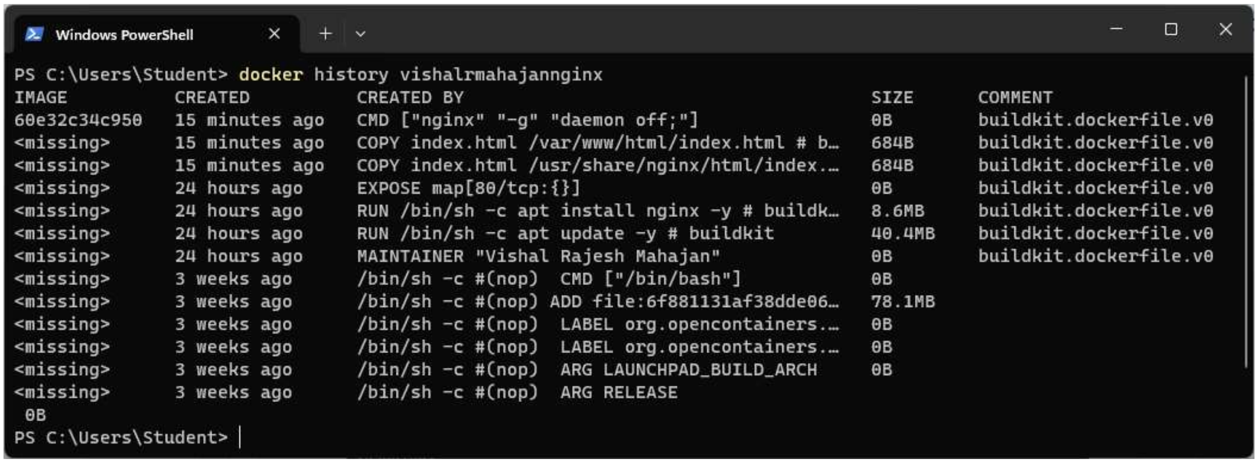


```
PS C:\Users\Student> docker inspect vishalrmahajannginx
[
    {
        "Id": "sha256:60e32c34c9506aa3ccd79eabc8bbb72811fb43b205b083f4b4477f751
b303e4a",
        "RepoTags": [
            "vishalrmahajannginx:latest"
        ],
        "RepoDigests": [],
        "Parent": "",
        "Comment": "buildkit.dockerfile.v0",
        "Created": "2024-10-08T05:24:11.5870375Z",
        "Container": "",
        "ContainerConfig": {
            "Hostname": "",
            "Domainname": "",
            "User": "",
            "AttachStdin": false,
            "AttachStdout": false,
            "AttachStderr": false,
```



```
            "Name": "overlay2"
        },
        "RootFS": {
            "Type": "layers",
            "Layers": [
                "sha256:ba8dbc5b24b59c2e6aff3639f32c5402af5e30be686342d08925ad8
52bd8c7c4",
                "sha256:db571c9031d3d2579c49dc520f72d99e1a82176e3d42c53318a3780
bf99504c5",
                "sha256:085595bc3766db2974f712381a2dec35d02415fc86d0353eea96415
8a45fa2ba",
                "sha256:24163ab78985e77ad68ea9346b3f5aa2c9c01f2c39a7b4633bf4101
a4dd6ed4f",
                "sha256:f185671145271954927971ad74722861dd9dabb0f8aeedad55c81f0
1b38d7bd1"
            ]
        },
        "Metadata": {
            "LastTagTime": "2024-10-08T05:24:11.6375828Z"
        }
    }
]
```

6) Displaying the history of an image using docker history imagename



```
PS C:\Users\Student> docker history vishalrmahajannginx
IMAGE          CREATED          CREATED BY                                      SIZE      COMMENT
60e32c34c950   15 minutes ago   CMD ["nginx" "-g" "daemon off;"]                0B        buildkit.dockerfile.v0
<missing>      15 minutes ago   COPY index.html /var/www/html/index.html # b…   684B      buildkit.dockerfile.v0
<missing>      15 minutes ago   COPY index.html /usr/share/nginx/html/index.…   684B      buildkit.dockerfile.v0
<missing>      24 hours ago     EXPOSE map[80/tcp:{}]                           0B        buildkit.dockerfile.v0
<missing>      24 hours ago     RUN /bin/sh -c apt install nginx -y # buildk…   8.6MB     buildkit.dockerfile.v0
<missing>      24 hours ago     RUN /bin/sh -c apt update -y # buildkit         40.4MB    buildkit.dockerfile.v0
<missing>      24 hours ago     MAINTAINER "Vishal Rajesh Mahajan"              0B        buildkit.dockerfile.v0
<missing>      3 weeks ago      /bin/sh -c #(nop)  CMD ["/bin/bash"]            0B
<missing>      3 weeks ago      /bin/sh -c #(nop) ADD file:6f881131af38dde06…   78.1MB
<missing>      3 weeks ago      /bin/sh -c #(nop)  LABEL org.opencontainers.…   0B
<missing>      3 weeks ago      /bin/sh -c #(nop)  LABEL org.opencontainers.…   0B
<missing>      3 weeks ago      /bin/sh -c #(nop)  ARG LAUNCHPAD_BUILD_ARCH     0B
<missing>      3 weeks ago      /bin/sh -c #(nop)  ARG RELEASE
 0B
PS C:\Users\Student>
```