

Ques 2 : Docker installation and basic container operations, Build an image from Dockerfile

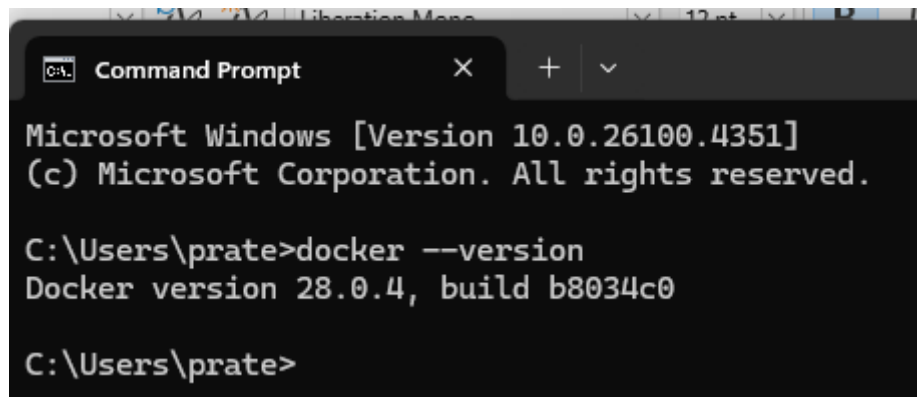
soln :

## 1. Docker Installation

### On Windows / Mac:

- Download Docker Desktop from: <https://www.docker.com/products/docker-desktop>
- Install and sign in (Docker ID)
- Open Docker Desktop → Make sure Docker Engine is running
- Test it with:

```
docker --version
```

A screenshot of a Windows Command Prompt window. The title bar says 'Command Prompt'. The window content shows the following text: 'Microsoft Windows [Version 10.0.26100.4351] (c) Microsoft Corporation. All rights reserved. C:\Users\prate>docker --version Docker version 28.0.4, build b8034c0 C:\Users\prate>'. The prompt is 'C:\Users\prate>'.

### On Linux (Ubuntu):

```
sudo apt update
sudo apt install docker.io -y
sudo systemctl start docker
sudo systemctl enable docker
docker --version
```

## 2. Basic Docker Container Operations

| Command                     | Purpose                                |
|-----------------------------|--|
| docker pull ubuntu          | Downloads Ubuntu image                 |
| docker run -it ubuntu       | Starts a container in interactive mode |
| docker ps                   | Lists running containers               |
| docker ps -a                | Lists all containers                   |
| docker start <container_id> | Starts a stopped container             |

| Command                                       | Purpose                                |
|---|--|
| <code>docker stop &lt;container_id&gt;</code> | Stops a running container              |
| <code>docker rm &lt;container_id&gt;</code>   | Removes a container                    |
| <code>docker rmi &lt;image_id&gt;</code>      | Removes an image                       |
| <code>docker exec -it &lt;id&gt; bash</code>  | Executes bash inside running container |
| <code>docker logs &lt;id&gt;</code>           | Shows logs of container                |

## OUTPUT:

### docker pull ubuntu

```
C:\Users\prate>docker pull ubuntu
Using default tag: latest
latest: Pulling from library/ubuntu
d9d352c11bbd: Pull complete
Digest: sha256:b59d21599a2b151e23eea5f6602f4af4d7d31c4e236d22bf0b62b86d2e386b8f
Status: Downloaded newer image for ubuntu:latest
docker.io/library/ubuntu:latest

C:\Users\prate>docker image ls
REPOSITORY    TAG       IMAGE ID      CREATED        SIZE
ubuntu        latest    bf16bdcff9c9  2 weeks ago    78.1MB
nginx         alpine    6769dc3a703c  8 weeks ago    48.2MB

C:\Users\prate>
```

### docker run -it ubuntu

```
C:\Users\prate>docker image ls
REPOSITORY    TAG       IMAGE ID      CREATED        SIZE
ubuntu        latest    bf16bdcff9c9  2 weeks ago    78.1MB
nginx         alpine    6769dc3a703c  8 weeks ago    48.2MB

C:\Users\prate>docker run -it ubuntu
root@eeefb452af640:/# mkdir temp
root@eeefb452af640:/# ls
bin boot dev etc home lib lib64 media mnt opt proc root run sbin srv sys temp temp usr var
root@eeefb452af640:/# |
```

### docker ps / docker ps -a

```
C:\Users\prate>docker ps
CONTAINER ID   IMAGE     COMMAND   CREATED   STATUS    PORTS   NAMES

C:\Users\prate>docker ps -a
CONTAINER ID   IMAGE     COMMAND   CREATED        STATUS      PORTS   NAMES
eeefb452af640  ubuntu   "/bin/bash"   About a minute ago   Exited (130) 17 seconds ago   vigorous_johnson
859f02866489  dafaec1c9b14  "/docker-entrypoint..."  16 minutes ago   Exited (0) 15 minutes ago   quizzical_wright
1a2f1dfc5008  dafaec1c9b14  "/docker-entrypoint..."  16 minutes ago   Exited (0) 16 minutes ago   musing_fermi

C:\Users\prate>
```

**docker start <container\_id>**

```
C:\Users\prate>docker start eefb452af640
eefb452af640

C:\Users\prate>docker ps
CONTAINER ID   IMAGE     COMMAND                  CREATED          STATUS          PORTS          NAMES
eefb452af640   ubuntu   "/bin/bash"             2 minutes ago   Up 4 seconds   -              vigorous_johnson

C:\Users\prate>
```

**docker stop id/name**

```
C:\Users\prate>docker stop vigorous_johnson
vigorous_johnson
```

**docker rm <container\_id>**

```
C:\Users\prate>docker rm eefb452af640
eefb452af640

C:\Users\prate>docker ps -a
CONTAINER ID   IMAGE     COMMAND                  CREATED          STATUS          PORTS          NAMES
859f02866489   dafaec1c9b14   "/docker-entrypoint..." 19 minutes ago   Exited (0) 19 minutes ago   -              quizzical_wright
1a2f1dfc5008   dafaec1c9b14   "/docker-entrypoint..." 20 minutes ago   Exited (0) 19 minutes ago   -              musing_fermi

C:\Users\prate>
```

**docker exec -it <id> bash**  
**docker logs**

```
C:\Users\prate>docker logs cfd6a39427a3
root@cfd6a39427a3:/# ^C
root@cfd6a39427a3:/# exit
exit
```

### **3. Build an Image from a Dockerfile**

**Create a Project Directory:**

```
mkdir docker-demo
cd docker-demo
```

**Create a Python File:**

```
app.py

print("Hello from inside a Docker container!")
```

```
C:\Users\prate>mkdir docker-demo

C:\Users\prate>cd docker-demo

C:\Users\prate\docker-demo>touch app.py
'touch' is not recognized as an internal or external command,
operable program or batch file.

C:\Users\prate\docker-demo>echo print("Hello from Docker!") > app.py

C:\Users\prate\docker-demo>ls
'ls' is not recognized as an internal or external command,
operable program or batch file.

C:\Users\prate\docker-demo>type nul > Requirements.txt

C:\Users\prate\docker-demo>dir
Volume in drive C is Windows
Volume Serial Number is 8468-B483

Directory of C:\Users\prate\docker-demo

15-06-2025  19:25    <DIR>          .
15-06-2025  19:22    <DIR>          ..
15-06-2025  19:24                30 app.py
15-06-2025  19:25                0 Requirements.txt
                2 File(s)                30 bytes
                2 Dir(s)  79,023,333,376 bytes free

C:\Users\prate\docker-demo>
```

Create Requirements.txt

Create a Dockerfile

```
C:\Users\prate\docker-demo>dir
Volume in drive C is Windows
Volume Serial Number is 8468-B483

Directory of C:\Users\prate\docker-demo

15-06-2025  19:31    <DIR>          .
15-06-2025  19:22    <DIR>          ..
15-06-2025  19:24                30 app.py
15-06-2025  19:31                0 Dockerfile
15-06-2025  19:25                0 Requirements.txt
                3 File(s)                30 bytes
                2 Dir(s)  79,021,404,160 bytes free

C:\Users\prate\docker-demo>notepad

C:\Users\prate\docker-demo>notepad Dockerfile

C:\Users\prate\docker-demo>type Dockerfile
# 1. Use official Python base image
FROM python:3.10-slim

# 2. Set working directory inside the container
WORKDIR /app

# 3. Copy all files from current folder to container
COPY . .

# 4. Install Python dependencies (if any)
RUN pip install -r requirements.txt

# 5. Run the application
CMD ["python", "app.py"]

C:\Users\prate\docker-demo>
```

**docker build -t my-python-app .**

```
C:\Users\prate\docker-demo>docker build -t my-python-app .
[+] Building 45.2s (9/9) FINISHED
=> [internal] load build definition from Dockerfile
=> => transferring dockerfile: 366B
=> [internal] load metadata for docker.io/library/python:3.10-slim
=> [auth] library/python:pull token for registry-1.docker.io
=> [internal] load .dockerignore
=> => transferring context: 2B
=> [1/4] FROM docker.io/library/python:3.10-slim@sha256:034724ef64585eeb0e82385e9aabcbeabfe5f7cae2c2dcedb1da95114372b6d7
=> => resolve docker.io/library/python:3.10-slim@sha256:034724ef64585eeb0e82385e9aabcbeabfe5f7cae2c2dcedb1da95114372b6d7
=> => sha256:034724ef64585eeb0e82385e9aabcbeabfe5f7cae2c2dcedb1da95114372b6d7 9.13kB / 9.13kB
=> => sha256:fd939bec23d8e9a1274d70e24db96bceed53e56612f828098f5505086a64f523 1.75kB / 1.75kB
=> => sha256:cce3651534b6639e18fe761c0f1bc3974459853da95ebadadc607194524d77a7 5.37kB / 5.37kB
=> => sha256:dad67da3f26bce15939543965e09c4059533b025f707aad72ed3d3f3a09c66f8 28.23MB / 28.23MB
=> => sha256:4b03b4f4fa5c508f2b215b45a26f6dd30b310aaa2a4a24b593f630bdf07da1a8 3.51MB / 3.51MB
=> => sha256:50a956a18493962b03f716b86299535ce63a1d6a1a1770be582b59f8fedb46b7 15.65MB / 15.65MB
=> => sha256:c14326ed6c858d7eb04960cbc1469da7ff6192285edf9bdb9d3c4cf035105826 250B / 250B
=> => extracting sha256:dad67da3f26bce15939543965e09c4059533b025f707aad72ed3d3f3a09c66f8
=> => extracting sha256:4b03b4f4fa5c508f2b215b45a26f6dd30b310aaa2a4a24b593f630bdf07da1a8
=> => extracting sha256:50a956a18493962b03f716b86299535ce63a1d6a1a1770be582b59f8fedb46b7
=> => extracting sha256:c14326ed6c858d7eb04960cbc1469da7ff6192285edf9bdb9d3c4cf035105826
=> [internal] load build context
=> => transferring context: 468B
=> [2/4] WORKDIR /app
```

**docker run my-python-app**

```
C:\Users\prate\docker-demo>docker run my-python-app
Hello from Docker!

C:\Users\prate\docker-demo>
```