

**NAME:** AMAN AGRAWAL  
**ROLL NO:** G24AIT172  
**SUB:** ML-OPs  
**TASK :** ASSIGNMENT-2 (Docker Fundamentals)

Docker Repository: <https://hub.docker.com/repository/docker/aman007agg/docker-assignment-python-hello/general>

## 1. Introduction:

This report describes the process of setting up a custom Docker image containing a Python script. The script prints a message with my roll number (**G24AIT172**) when executed inside a container.

The goal is to pull an official Python image, customize it with a simple script, build a Docker image, and push it to Docker Hub.

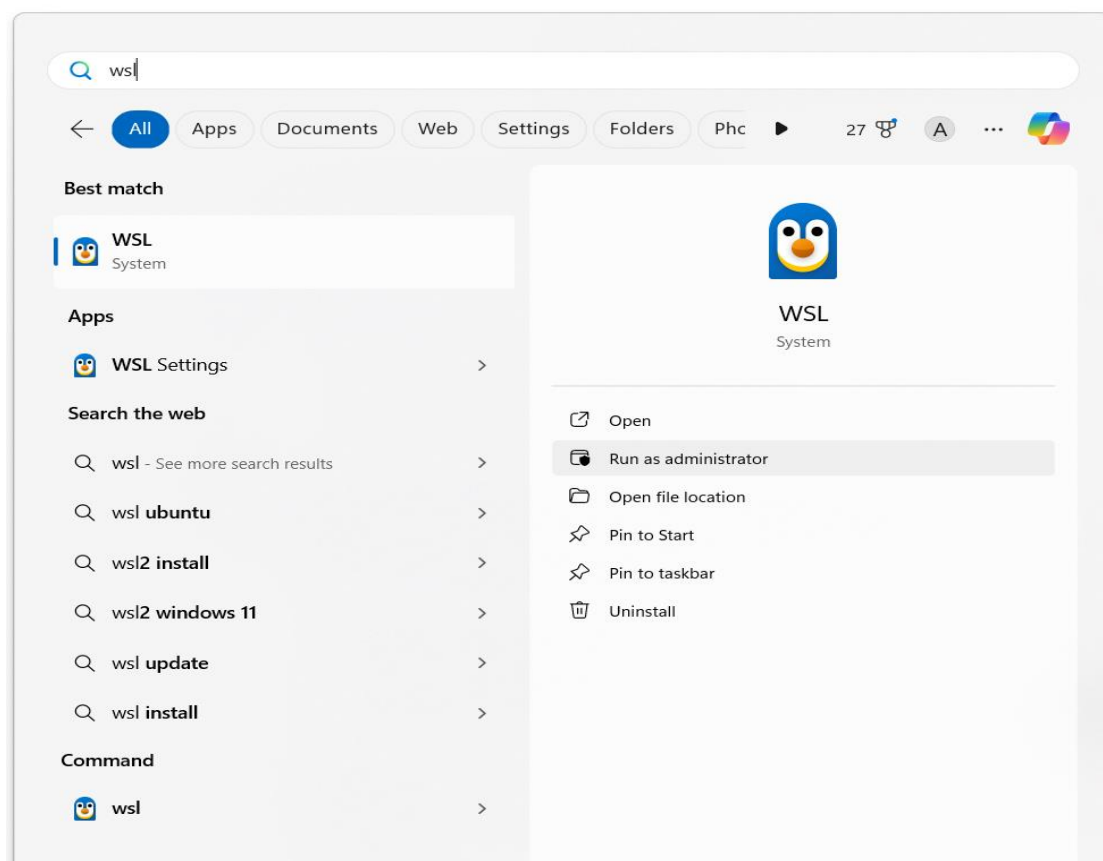
## 2. Setup Process

### 2.1. Install Docker Desktop on Windows.

Pre-requisite:

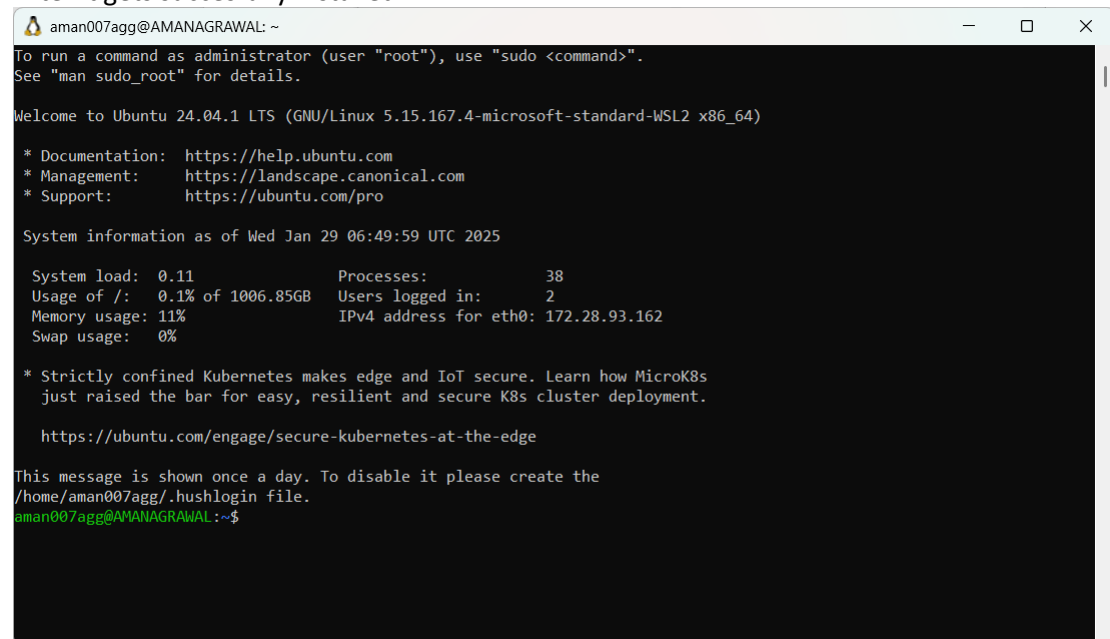
#### (A.) Install WSL (Windows Subsystem for Linux)-WSL

Search for WSL on your local system , and click run as administrator



Run the command: **wsl.exe --install**

After it gets successfully installed .



```
aman007agg@AMANAGRAWAL: ~
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

Welcome to Ubuntu 24.04.1 LTS (GNU/Linux 5.15.167.4-microsoft-standard-WSL2 x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/pro

System information as of Wed Jan 29 06:49:59 UTC 2025

System load:  0.11          Processes:            38
Usage of /:   0.1% of 1006.85GB   Users logged in:     2
Memory usage: 11%          IPv4 address for eth0: 172.28.93.162
Swap usage:   0%

 * Strictly confined Kubernetes makes edge and IoT secure. Learn how MicroK8s
   just raised the bar for easy, resilient and secure K8s cluster deployment.

https://ubuntu.com/engage/secure-kubernetes-at-the-edge

This message is shown once a day. To disable it please create the
/home/aman007agg/.hushlogin file.
aman007agg@AMANAGRAWAL: ~$
```

**(B. ) To set WSL2 as the default version for future installations:**

Run the command: **wsl --set-default-version 2**

Kindly Note:

When prompted to create a UNIX username during the WSL (Windows Subsystem for Linux) installation process, you simply need to:

1. Enter a preferred username. This username does not need to match your Windows username, but it will be your default username for logging into the WSL environment.
2. Press **Enter**.
3. You'll then be asked to create a password for this user. Ensure the password is something you'll remember, as it will be needed to authenticate commands requiring elevated privileges (via sudo).

**Enter new UNIX username:** yourusername

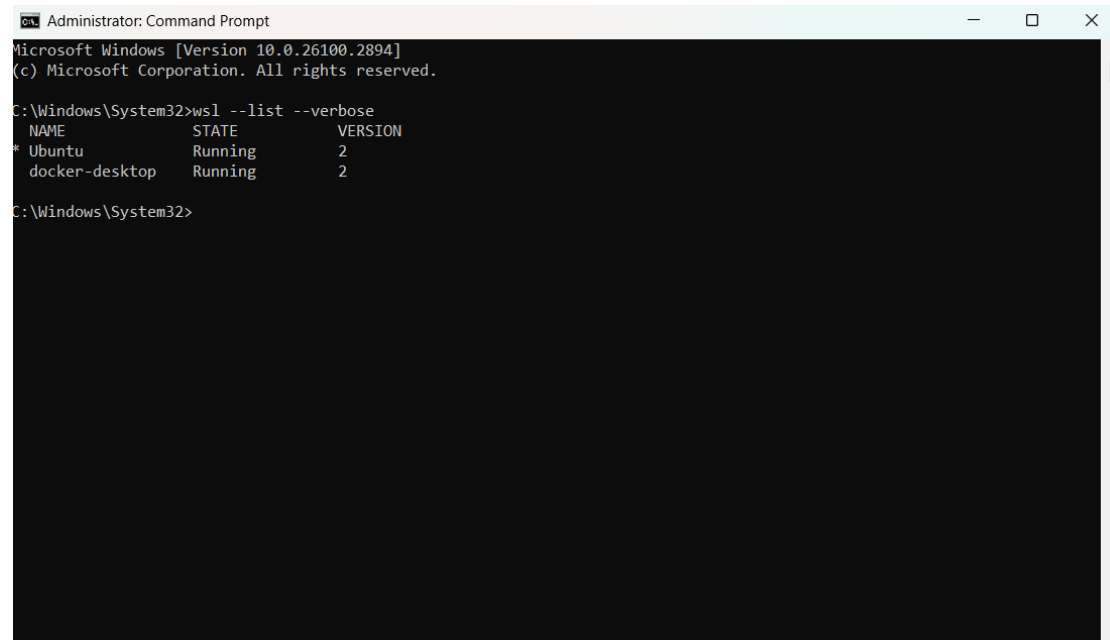
**New password:** \*\*\*\*\*

**Retype new password:** \*\*\*\*\*

**(C. ) To check the version of WSL you are using, you can run:**

Run the command: **wsl --list --verbose**

You can run the command on cmd as an administrator mode

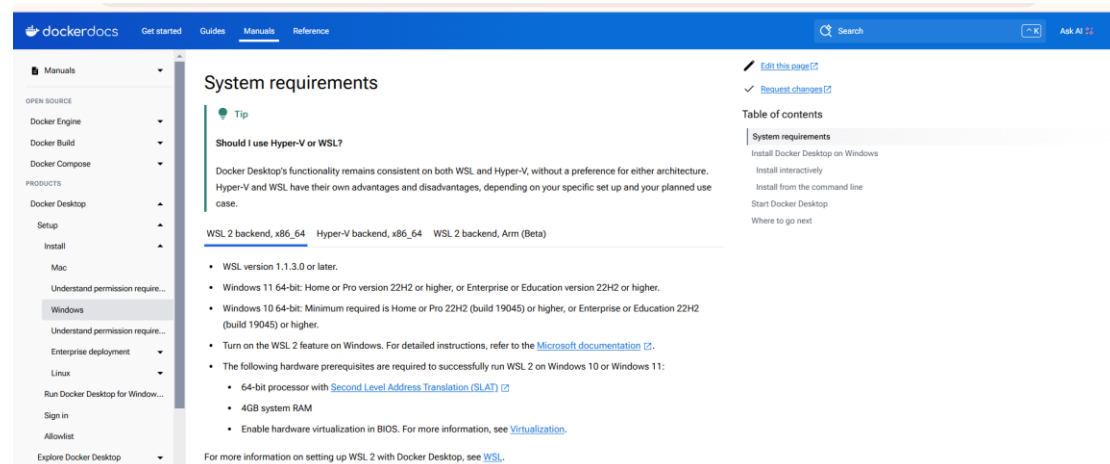


```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.26100.2894]
(c) Microsoft Corporation. All rights reserved.

C:\Windows\System32>wsl --list --verbose
  NAME                STATE      VERSION
* Ubuntu              Running    2
  docker-desktop      Running    2

C:\Windows\System32>
```

**(D.) You can check the system requirements before setting up the Docker Desktop for windows.**



The screenshot shows the Docker Docs website with the 'System requirements' page selected. The page includes a table of contents, a 'Tip' section, and a list of requirements for running Docker Desktop on Windows.

### System requirements

**Tip**

**Should I use Hyper-V or WSL?**

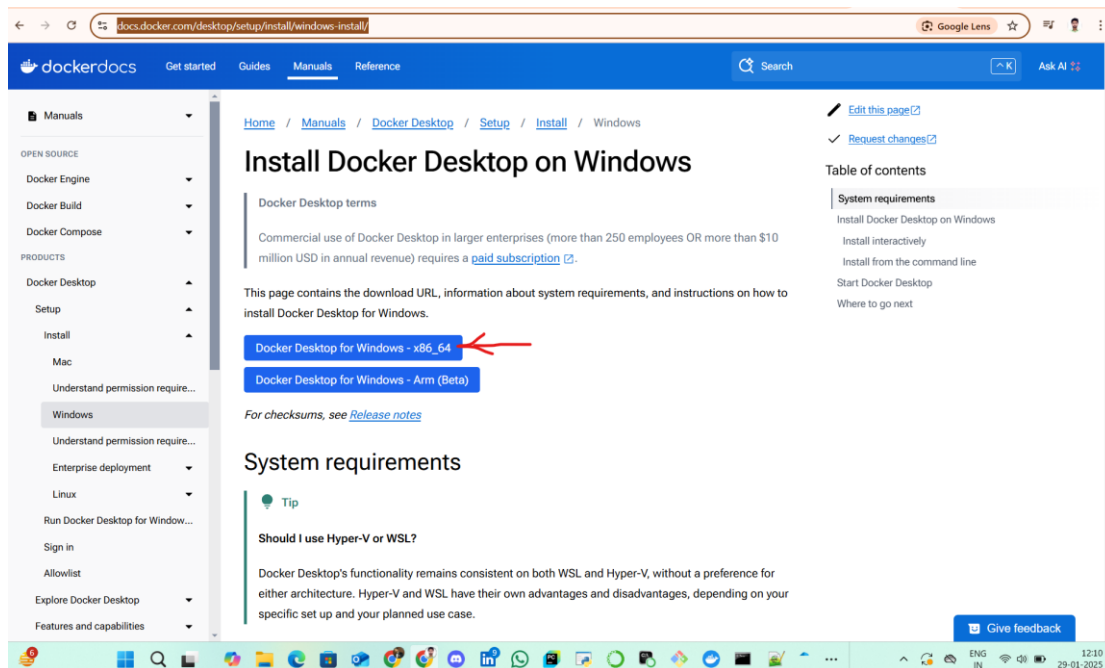
Docker Desktop's functionality remains consistent on both WSL and Hyper-V, without a preference for either architecture. Hyper-V and WSL have their own advantages and disadvantages, depending on your specific set up and your planned use case.

WSL 2 backend, x86\_64    Hyper-V backend, x86\_64    WSL 2 backend, Arm (Beta)

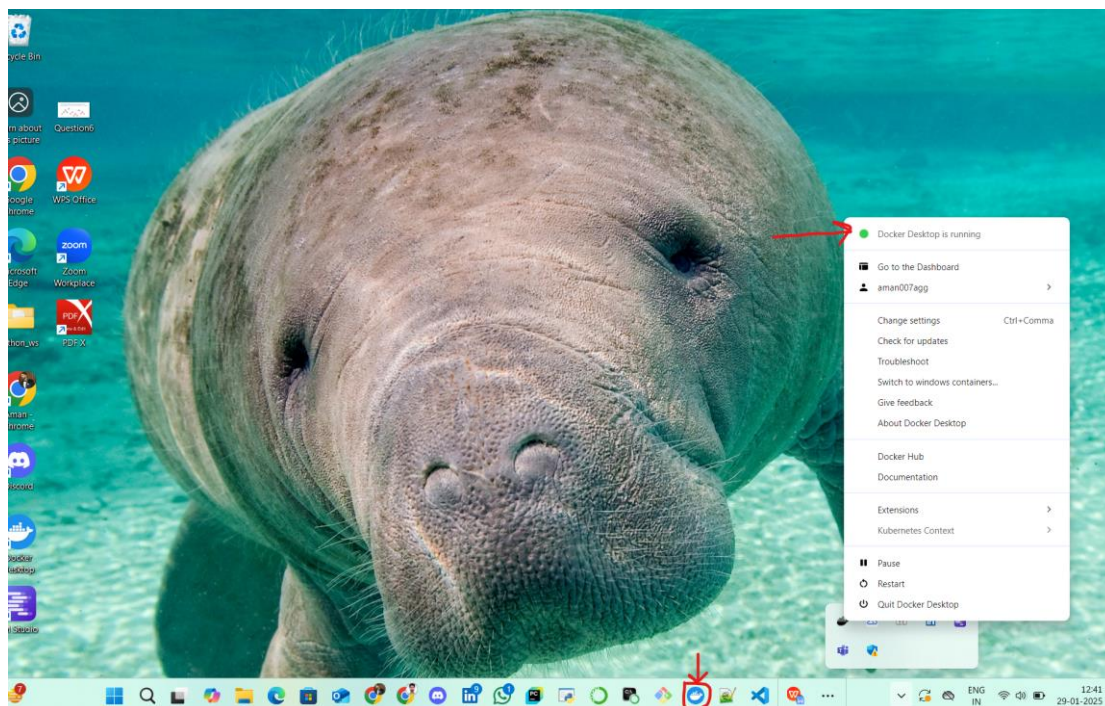
- WSL version 1.1.3.0 or later.
- Windows 11 64-bit: Home or Pro version 22H2 or higher, or Enterprise or Education version 22H2 or higher.
- Windows 10 64-bit: Minimum required is Home or Pro 22H2 (build 19045) or higher, or Enterprise or Education 22H2 (build 19045) or higher.
- Turn on the WSL 2 feature on Windows. For detailed instructions, refer to the [Microsoft documentation](#).
- The following hardware prerequisites are required to successfully run WSL 2 on Windows 10 or Windows 11:
  - 64-bit processor with [Second Level Address Translation \(SLAT\)](#)
  - 4GB system RAM
  - Enable hardware virtualization in BIOS. For more information, see [Virtualization](#).

For more information on setting up WSL 2 with Docker Desktop, see [WSL](#).

(E.) Go to the specified url and download the Docker Desktop on Windows—  
<https://docs.docker.com/desktop/setup/install/windows-install/>

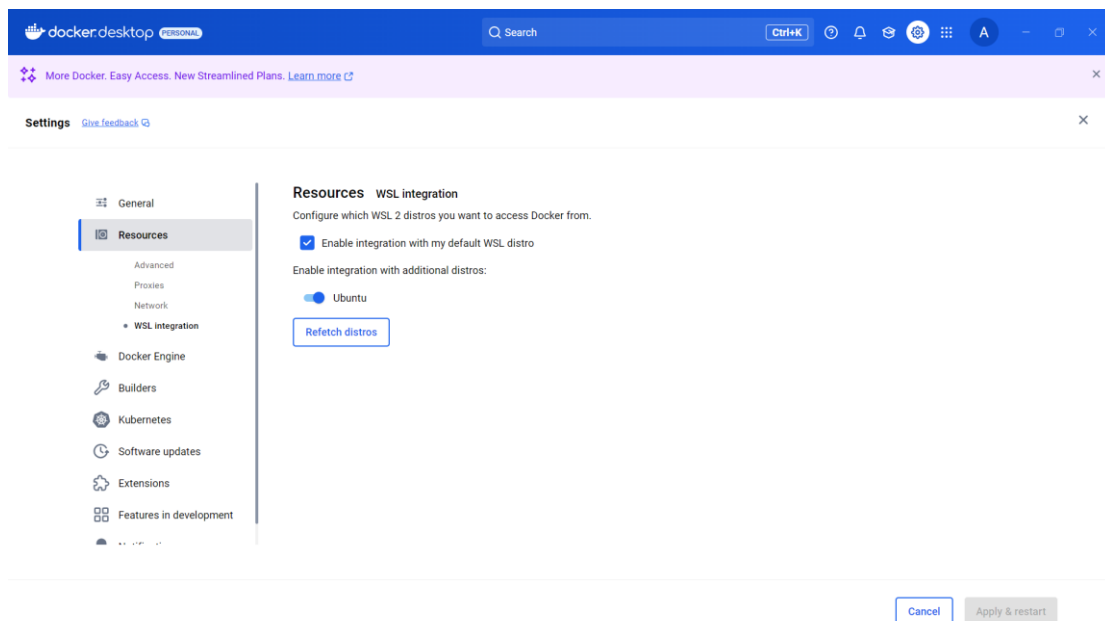


(F.) Once it gets successfully installed, make sure that docker is in running mode.



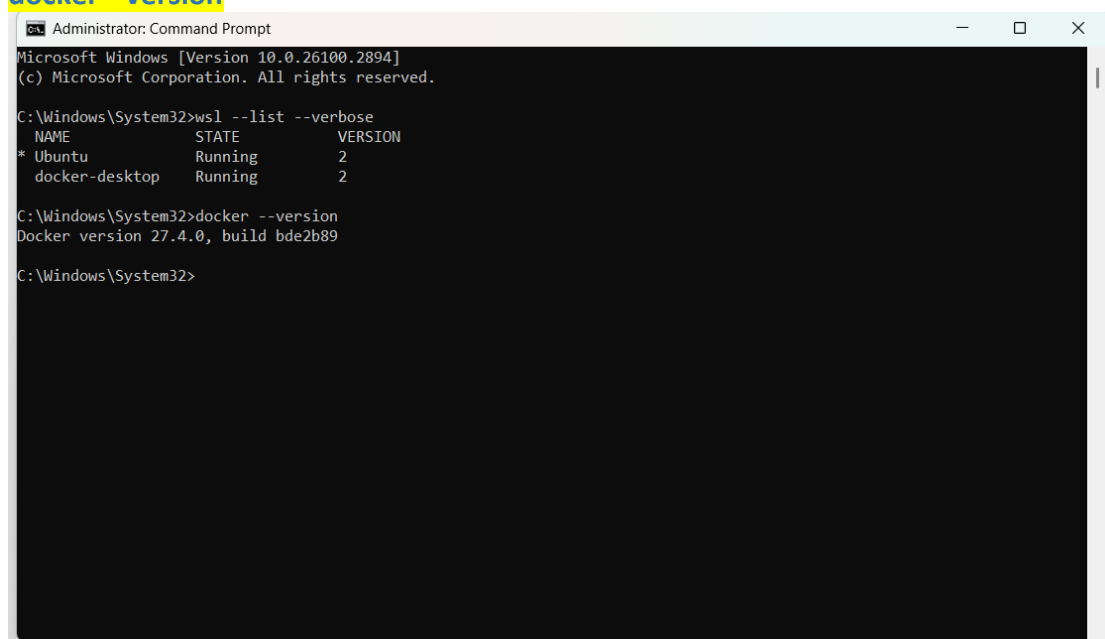
**(G.) Enable WSL 2 Integration in Docker:** During the installation, Docker Desktop will ask you to enable WSL 2 integration. Make sure that you check the option to use WSL 2 as the backend for Docker. Docker will automatically set this up for you.

- Once Docker Desktop is installed, open Docker Desktop from the Start menu.
- Go to **Settings** (gear icon) > **Resources** > **WSL Integration**.
- Ensure that **Enable integration with my default WSL distro** is checked. You can also enable integration with other WSL distributions if you have more than one.



**(H.) Test Docker Installation:** Once Docker Desktop is running, open a command prompt or PowerShell window and run the following command to verify Docker is installed and running:

**docker --version**



## 3. Step-by-Step Execution

### 3.1 Create a new docker hub repository-

The image shows two screenshots of the Docker Hub interface. The top screenshot is the 'Create repository' page. It features a 'Namespace' dropdown set to 'aman007agg' and a 'Repository Name' field containing 'docker-assignment-python-hello'. A 'Short description' box contains the text 'This is the assignment given for learning docker fundamentals. Roll No- G24AIT172'. Under the 'Visibility' section, the 'Public' radio button is selected, indicating the repository will appear in Docker Hub search results. 'Cancel' and 'Create' buttons are at the bottom right. The bottom screenshot shows the repository page after creation. The breadcrumb path is 'aman007agg / Repositories / docker-assignment-python-hello / General'. The 'General' tab is active, showing the repository name 'aman007agg/docker-assignment-python-hello' and the same description. It includes sections for 'Docker commands' (with a 'Public view' button), 'Tags' (marked as 'INCOMPLETE'), 'Automated builds' (with an 'Upgrade' button), and 'Repository overview' (also marked as 'INCOMPLETE').

Pull command - `docker pull aman007agg/docker-assignment-python-hello`

**A. Pull the official Python image, python:-alpine (the smallest version).**

## docker pull python:3.11-alpine

The Alpine version is chosen because it is a lightweight Linux distribution optimized for containers.

```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.26100.2894]
(c) Microsoft Corporation. All rights reserved.

C:\Windows\System32>wsl --list --verbose
   NAME            STATE          VERSION
*  Ubuntu           Running         2
   docker-desktop   Running         2

C:\Windows\System32>docker --version
Docker version 27.4.0, build bde2b89

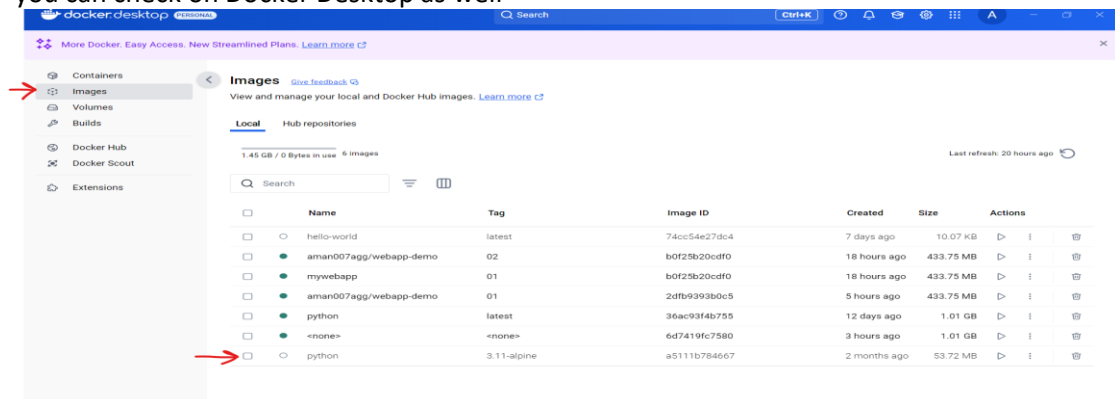
C:\Windows\System32>docker pull python:3.11-alpine
3.11-alpine: Pulling from library/python
1f3e46996e29: Already exists
dfb81f221332: Pull complete
69d04f35a207: Pull complete
5c3947958a83: Pull complete
Digest: sha256:9af3561825050da182afc74b106388af570b99c500a69c8216263aa245a2001b
Status: Downloaded newer image for python:3.11-alpine
docker.io/library/python:3.11-alpine

C:\Windows\System32>
```

```
C:\Windows\System32>docker images
```

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
<none>	<none>	6d7419fc7580	3 hours ago	1.02GB
aman007agg/webapp-demo	01	2dfb9393b0c5	5 hours ago	434MB
aman007agg/webapp-demo	02	b0f25b20cdf0	18 hours ago	434MB
mywebapp	01	b0f25b20cdf0	18 hours ago	434MB
hello-world	latest	74cc54e27dc4	7 days ago	10.1kB
python	latest	36ac93f4b755	11 days ago	1.02GB
python	3.11-alpine	a5111b784667	7 weeks ago	53.7MB

you can check on Docker Desktop as well



**B. Build a custom Docker image by creating a directory, and adding a hello.py file that prints "Hello from the container, Your Roll No.(replace this with your roll no.)". Use a Dockerfile to create the image.**

### 1. Create a Directory -

Have created a directory named - **"docker-assignment"**

```
C:\Aman_Docs\IIT_Jodhpur_M-Tech_AI_ML\Course_Start\Trimester-2_Course\ML_OPs>mkdir docker-assignment

C:\Aman_Docs\IIT_Jodhpur_M-Tech_AI_ML\Course_Start\Trimester-2_Course\ML_OPs>cd docker-assignment
'cd' is not recognized as an internal or external command,
operable program or batch file.

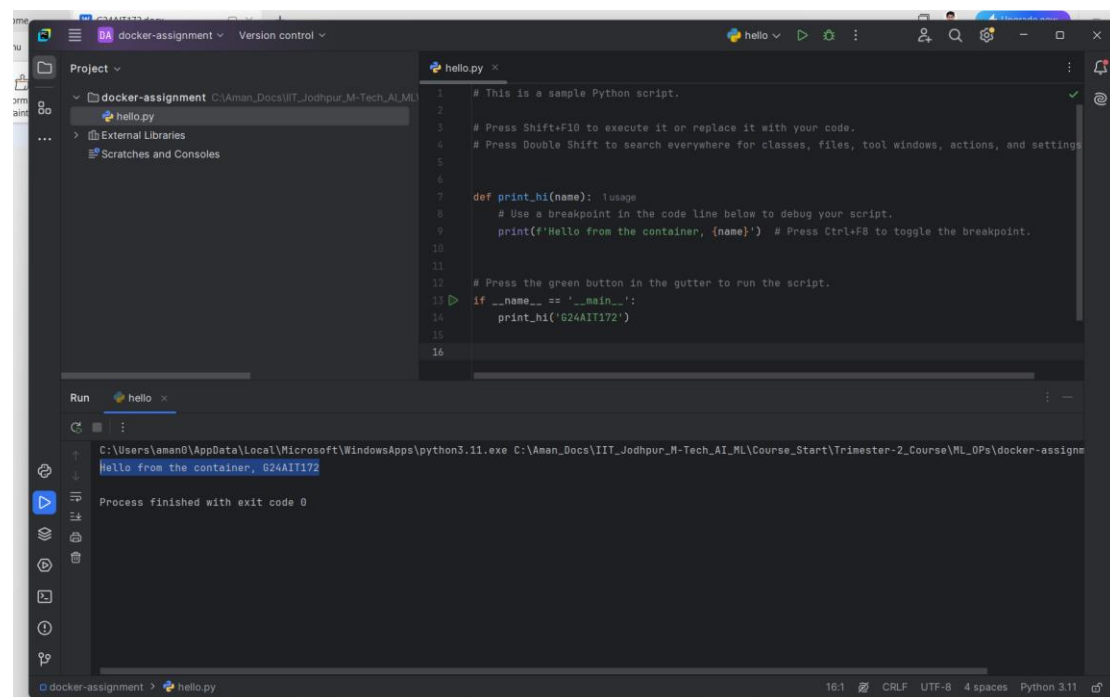
C:\Aman_Docs\IIT_Jodhpur_M-Tech_AI_ML\Course_Start\Trimester-2_Course\ML_OPs>cd docker-assignment

C:\Aman_Docs\IIT_Jodhpur_M-Tech_AI_ML\Course_Start\Trimester-2_Course\ML_OPs\docker-assignment>
```

**Note : I am using Pycharm to create custom Docker Image**

### 2. Create a hello.py (python) file-

So , first I am creating a python file - **hello.py** with the following content:  
**"Hello from the container,G24AIT172"**





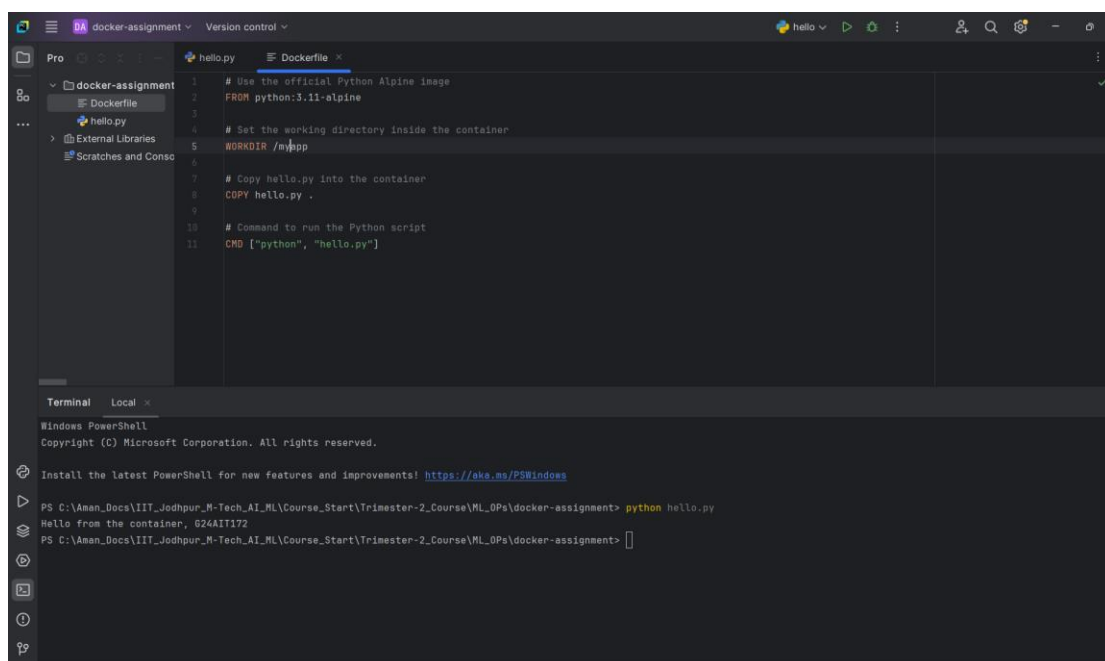
### 3. Now creating a Dockerfile

```
# Use the official Python Alpine image
FROM python:3.11-alpine
```

```
# Set the working directory inside the container
WORKDIR /myapp
```

```
# Copy hello.py into the container
COPY hello.py .
```

```
# Command to run the Python script
CMD ["python", "hello.py"]
```



The screenshot shows a Visual Studio Code editor window with a file explorer on the left. The file explorer shows a folder named 'docker-assignment' containing 'Dockerfile', 'hello.py', and 'External Libraries'. The main editor area displays the 'Dockerfile' with the following content:

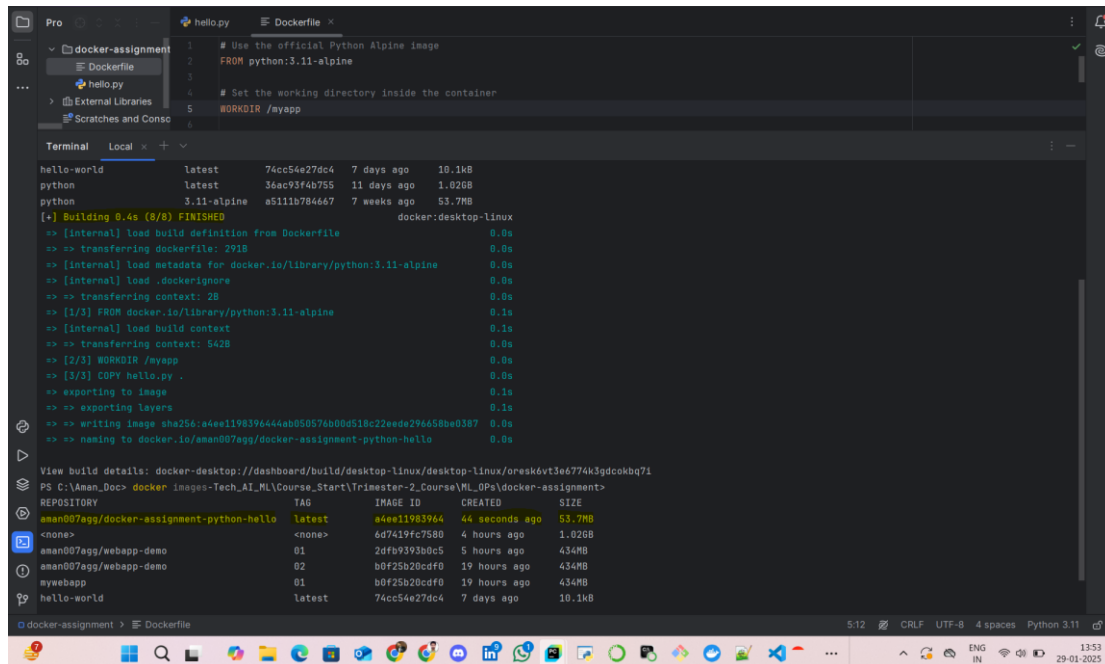
```
1 # Use the official Python Alpine image
2 FROM python:3.11-alpine
3
4 # Set the working directory inside the container
5 WORKDIR /myapp
6
7 # Copy hello.py into the container
8 COPY hello.py .
9
10 # Command to run the Python script
11 CMD ["python", "hello.py"]
```

Below the editor is a terminal window titled 'Terminal Local'. It shows the command prompt 'PS C:\Amen\_Docs\IIT\_Jodhpur\_M-Tech\_AI\_ML\Course\_Start\Trimester-2\_Course\ML\_OPs\docker-assignment>' and the command 'python hello.py' being executed. The output of the command is 'Hello from the container, 624AII172'.

- **FROM python:3.11-alpine:** Specifies the base image.
- **WORKDIR /myapp:** Sets the working directory inside the container.
- **COPY hello.py .:** Copies the script into the container.
- **CMD ["python", "hello.py"]:** Runs the script when the container starts.

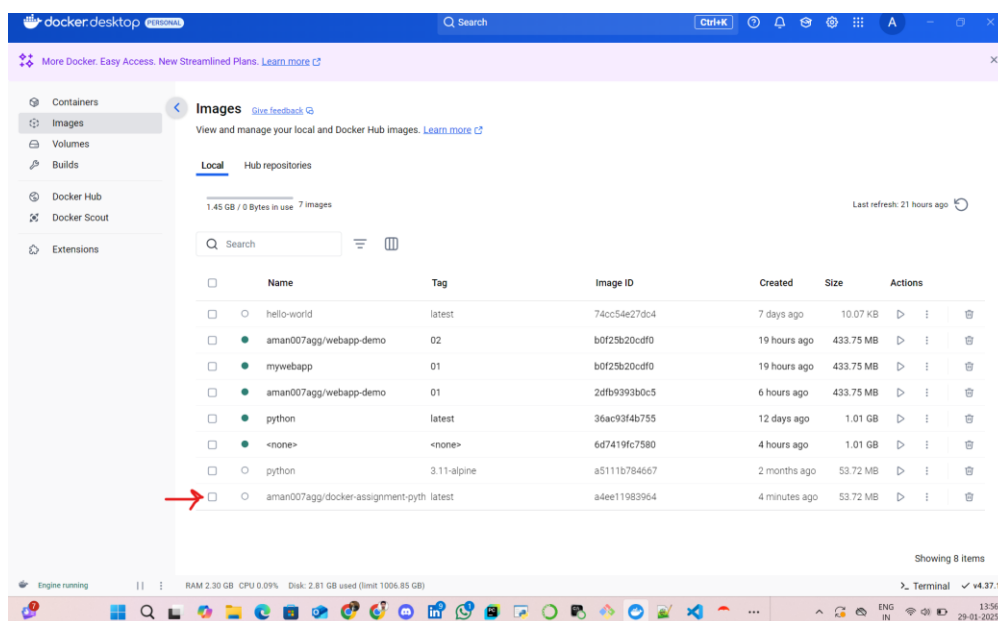
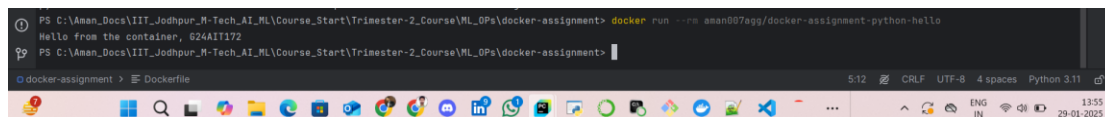
#### 4. Building and Running the Docker Image

```
docker build -t aman007agg/docker-assignment-python-hello .
```



To verify that my image works correctly, I ran:

```
docker run --rm aman007agg/docker-assignment-python-hello
```



**C. Push the created Docker image to DockerHub. The image should print the above statement when pulled and run. .**

### 1. Pushing the Image to Docker Hub

First, I logged into Docker Hub using:

**docker login**

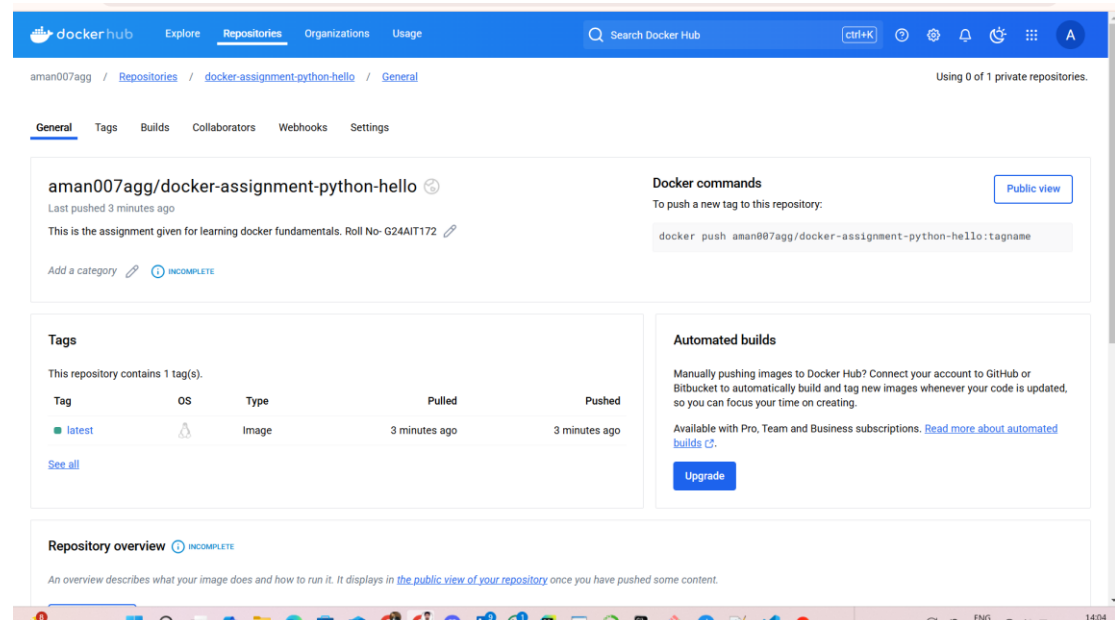
```
PS C:\Aman_Docs\IIIT_Jodhpur_M-Tech_AI_ML\Course_Start\Trimester-2_Course\ML_OPs\docker-assignment> docker login
Authenticating with existing credentials...
Login Succeeded
PS C:\Aman_Docs\IIIT_Jodhpur_M-Tech_AI_ML\Course_Start\Trimester-2_Course\ML_OPs\docker-assignment>
```

after it gets Authenticated successfully.

I pushed my image to my repository: **aman007agg/docker-assignment-python-hello**

**docker push aman007agg/docker-assignment-python-hello**

```
PS C:\Aman_Docs\IIIT_Jodhpur_M-Tech_AI_ML\Course_Start\Trimester-2_Course\ML_OPs\docker-assignment> docker push aman007agg/docker-assignment-python-hello
Using default tag: latest
The push refers to repository [docker.io/aman007agg/docker-assignment-python-hello]
4573a64f9b48: Pushed
f2db46c11eab: Pushed
5b93f923fc43: Mounted from library/python
d8362f78f67b: Mounted from library/python
1e84b8a3e3cd: Mounted from library/python
a09b4247e36a: Mounted from aman007agg/webapp-demo
latest: digest: sha256:cf5619a78f9bdfc998f2df128b20199af27f17a2461379546cf66d55b21d92b size: 1570
PS C:\Aman_Docs\IIIT_Jodhpur_M-Tech_AI_ML\Course_Start\Trimester-2_Course\ML_OPs\docker-assignment>
```



dockerhub


ExploreRepositoriesOrganizationsUsage

Search Docker Hub

ctrl+k

A

Explore / aman007agg/docker-assignment-python-hello



## aman007agg/docker-assignment-python-hello

By aman007agg · Updated 1 minute ago

This is the assignment given for learning docker fundamentals. Roll No- G24AIT172

[IMAGE](#)

☆0 ↓0

Manage Repository

OverviewTags

Sort by NewestFilter tags

TAG

latest

Last pushed a minute ago by aman007agg

docker pull aman007agg/docker-assignment-python-hello:latestCopy

Digest	OS/ARCH	Last pull	Compressed size
cf5619e78fdf	linux/amd64	a few seconds ago	19.33 MB

dockerhub


ExploreRepositoriesOrganizationsUsage

Search Docker Hub

ctrl+k

A

Explore / aman007agg/docker-assignment-python-hello / latest



## aman007agg/docker-assignment-python-hello:latest

MANIFEST DIGEST sha256:cf5619e78fdfbdc998f2df128b20199af27117a2461379546cf6d55b21d92b

OS/ARCHlinux/amd64

COMPRESSED SIZE19.33 MB

LAST PUSHEDa minute ago by aman007agg

TYPEImage

MANIFEST DIGESTsha256:cf5619e7...

Delete Tag

Image LayersVulnerabilities

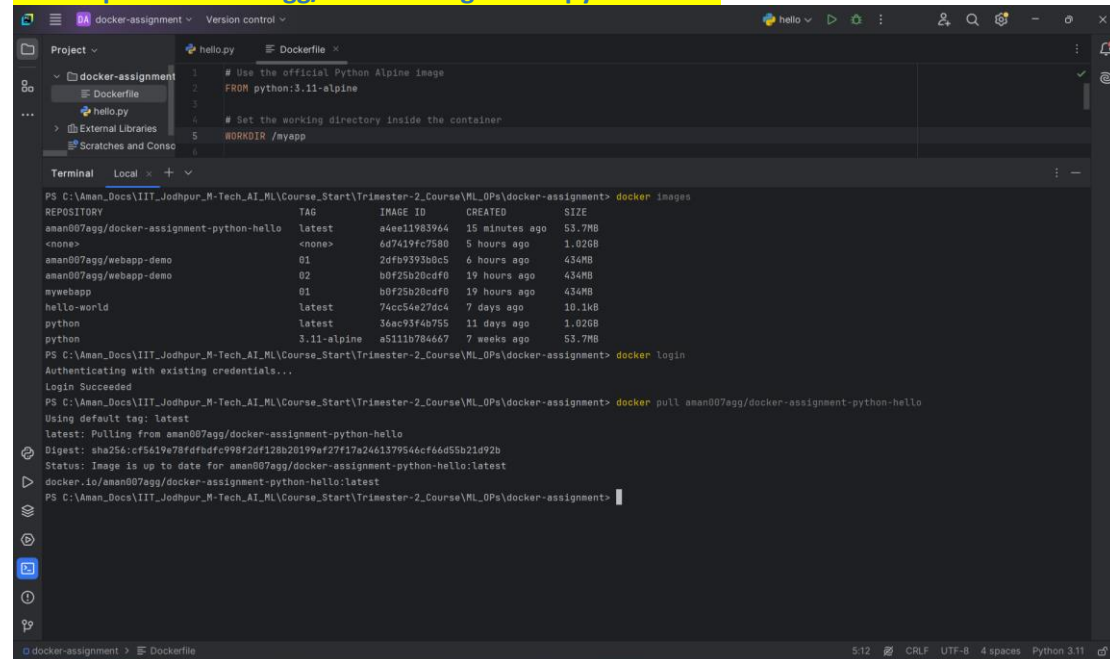
Image Layers

Command

1 ADD alpine-minirootfs-3.21.2-x86_64.tar.gz / # buildkit	3.47 MB	ADD alpine-minirootfs-3.21.2-x86_64.tar.gz / # buildkit
2 CMD ["/bin/sh"]	0 B	
3 ENV PATH=/usr/local/bin:/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/b...	0 B	
4 ENV LANG=C.UTF-8	0 B	
5 RUN /bin/sh -c set -eux;	448.09 KB	
6 ENV GPQ_KEY=A835C8C19219BA821ECEA8684E628F8D684696D	0 B	
7 ENV PYTHON_VERSION=3.11.11	0 B	
8 ENV PYTHON_SHA256=2a9928c7a0cd236de33644ed988a13cbbc21058bdc528febb681575ed73be3	0 B	

## 2. Steps to Pull the Image and Run the Container:

### docker pull aman007agg/docker-assignment-python-hello



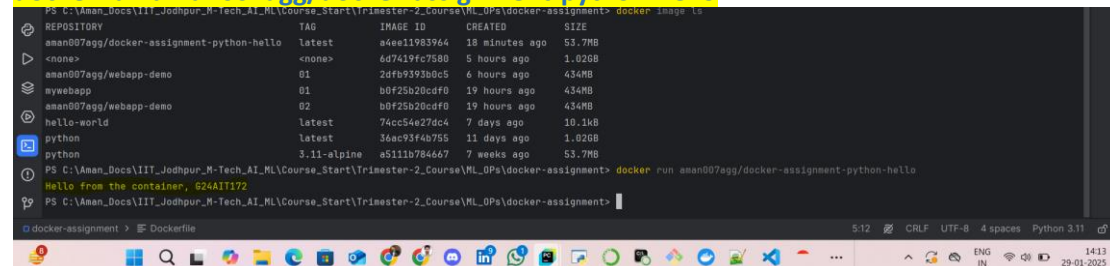
```
PS C:\Aman_Docs\IIT_Jodhpur_M-Tech_AI_ML\Course_Start\Trimester-2_Course\ML_OPs\docker-assignment> docker images
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
aman007agg/docker-assignment-python-hello latest             a4ee11983964       15 minutes ago    53.7MB
<none>               <none>             6d7419fc7580       5 hours ago       1.02GB
aman007agg/webapp-demo 01                 2dfb9393b0c5       6 hours ago       434MB
aman007agg/webapp-demo 02                 b0f25b20cdf0       19 hours ago      434MB
mywebapp             01                 b0f25b20cdf0       19 hours ago      434MB
hello-world          latest             74cc54e27dc4       7 days ago        10.1kB
python                latest             36ac93f4b755       11 days ago       1.02GB
python                3.11-alpine       a5111b784667       7 weeks ago       53.7MB

PS C:\Aman_Docs\IIT_Jodhpur_M-Tech_AI_ML\Course_Start\Trimester-2_Course\ML_OPs\docker-assignment> docker login
Authenticating with existing credentials...
Login Succeeded

PS C:\Aman_Docs\IIT_Jodhpur_M-Tech_AI_ML\Course_Start\Trimester-2_Course\ML_OPs\docker-assignment> docker pull aman007agg/docker-assignment-python-hello
Using default tag: latest
latest: Pulling from aman007agg/docker-assignment-python-hello
Digest: sha256:cf5419e78f9bdfc998f2df128b20199ef27f17a2461379546cf64d55b21d92b
Status: Image is up to date for aman007agg/docker-assignment-python-hello:latest
docker.io/aman007agg/docker-assignment-python-hello:latest
PS C:\Aman_Docs\IIT_Jodhpur_M-Tech_AI_ML\Course_Start\Trimester-2_Course\ML_OPs\docker-assignment>
```

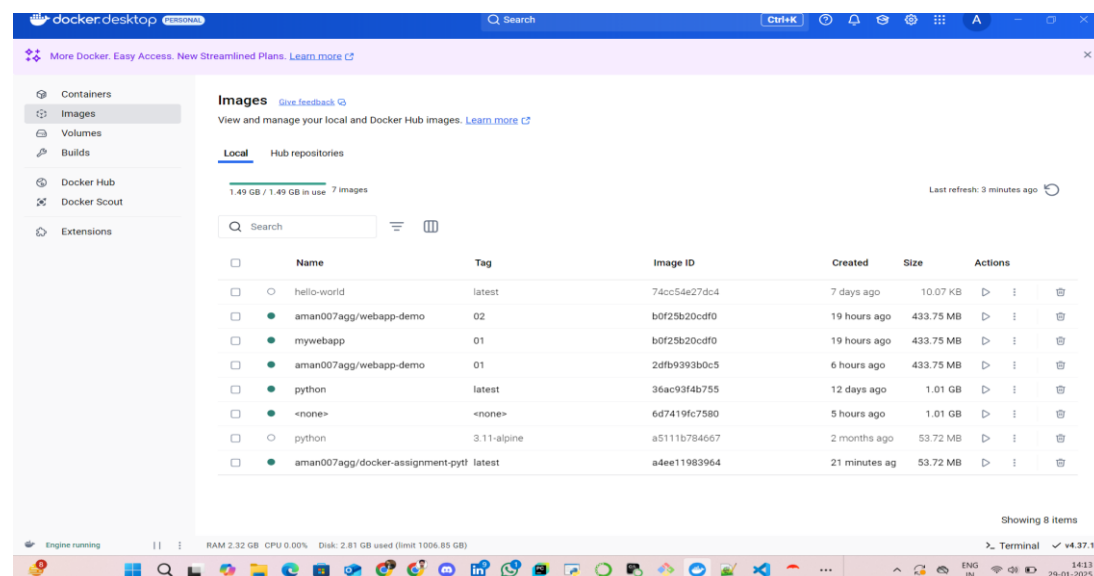
## Run the Container:

### docker run aman007agg/docker-assignment-python-hello



```
PS C:\Aman_Docs\IIT_Jodhpur_M-Tech_AI_ML\Course_Start\Trimester-2_Course\ML_OPs\docker-assignment> docker image ls
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
aman007agg/docker-assignment-python-hello latest             a4ee11983964       16 minutes ago    53.7MB
<none>               <none>             6d7419fc7580       5 hours ago       1.02GB
aman007agg/webapp-demo 01                 2dfb9393b0c5       6 hours ago       434MB
mywebapp             01                 b0f25b20cdf0       19 hours ago      434MB
aman007agg/webapp-demo 02                 b0f25b20cdf0       19 hours ago      434MB
hello-world          latest             74cc54e27dc4       7 days ago        10.1kB
python                latest             36ac93f4b755       11 days ago       1.02GB
python                3.11-alpine       a5111b784667       7 weeks ago       53.7MB

PS C:\Aman_Docs\IIT_Jodhpur_M-Tech_AI_ML\Course_Start\Trimester-2_Course\ML_OPs\docker-assignment> docker run aman007agg/docker-assignment-python-hello
Hello from the container, 624A1172
PS C:\Aman_Docs\IIT_Jodhpur_M-Tech_AI_ML\Course_Start\Trimester-2_Course\ML_OPs\docker-assignment>
```



The screenshot displays the Docker Desktop application. The left sidebar shows navigation options: Containers, Images, Volumes, Builds, Docker Hub, Docker Scout, and Extensions. The main area is titled 'Containers' and shows a list of running containers. A red arrow points to the container named 'flamboyant\_ram' with ID '217bc19880b6', which is using the image 'aman007agg/docker-assignment-python-hello'. Below this, a terminal window shows the output of the 'docker ps' command, listing the same containers with their IDs, images, commands, creation times, statuses, ports, and names.

Name	Container ID	Image	Port(s)	CPU (%)	Last start	Actions
mywebapp-02	6f04691dbe00	2dfb9393b0c5	3000:3000	0.02%	6 hours ag	[Stop] [Refresh] [Delete]
mywebapp-01	1d00024bb215	mywebapp:01	3001:3000	0.01%	6 hours ag	[Stop] [Refresh] [Delete]
musings_agnesi	340e9deae2e	python:latest		0%	5 hours ag	[Stop] [Refresh] [Delete]
zen_chatelet	4cb36ef49868	6d7419fc7580		0%	5 hours ag	[Stop] [Refresh] [Delete]
flamboyant_ram	217bc19880b6	aman007agg/docker-assignment-python-hello		0%	1 minute a	[Stop] [Refresh] [Delete]

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
217bc19880b6	aman007agg/docker-assignment-python-hello	"python hello.py"	3 minutes ago	Exited (0) 3 minutes ago		flamboyant_ramanujan
4cb36ef49868	6d7419fc7580	"python ZigzagProble..."	5 hours ago	Exited (0) 5 hours ago		zen_chatelet
340e9deae2e	python:latest	"python3"	5 hours ago	Exited (0) 5 hours ago		musings_agnesi
1d00024bb215	mywebapp:01	"docker-entrypoint.s..."	6 hours ago	Up 6 hours	0.0.0.0:3001->3000/tcp	mywebapp-01
6f04691dbe00	2dfb9393b0c5	"docker-entrypoint.s..."	6 hours ago	Up 6 hours	0.0.0.0:3000->3000/tcp	mywebapp-02

## 4. Conclusion

This assignment helped me understand the basics of Docker image creation and deployment. I successfully built a custom Docker image, tested it locally, and pushed it to Docker Hub.

Through this process, I became familiar with working with Dockerfile, docker build, docker run, and docker push commands.