IMPLEMENTATION OF CONTAINERS

Name:Rohit S

RollNo:2023115085

Aim

To install Docker on Windows Subsystem for Linux (WSL), create and manage containers, and execute a Python environment inside a Docker container.

Objective

- Install Docker Engine in WSL.
- Verify Docker functionality.
- Run lightweight containers.
- Deploy a web server container.
- Execute Python inside a containerized environment.

System Requirements

- Windows 10/11 with WSL enabled
- Ubuntu (WSL distribution)
- Docker Engine
- Internet connectivity

Procedure

Step 1 – Install Docker

Docker packages and dependencies were installed using the apt package manager.

Command used:

sudo apt update

sudo apt install docker.io

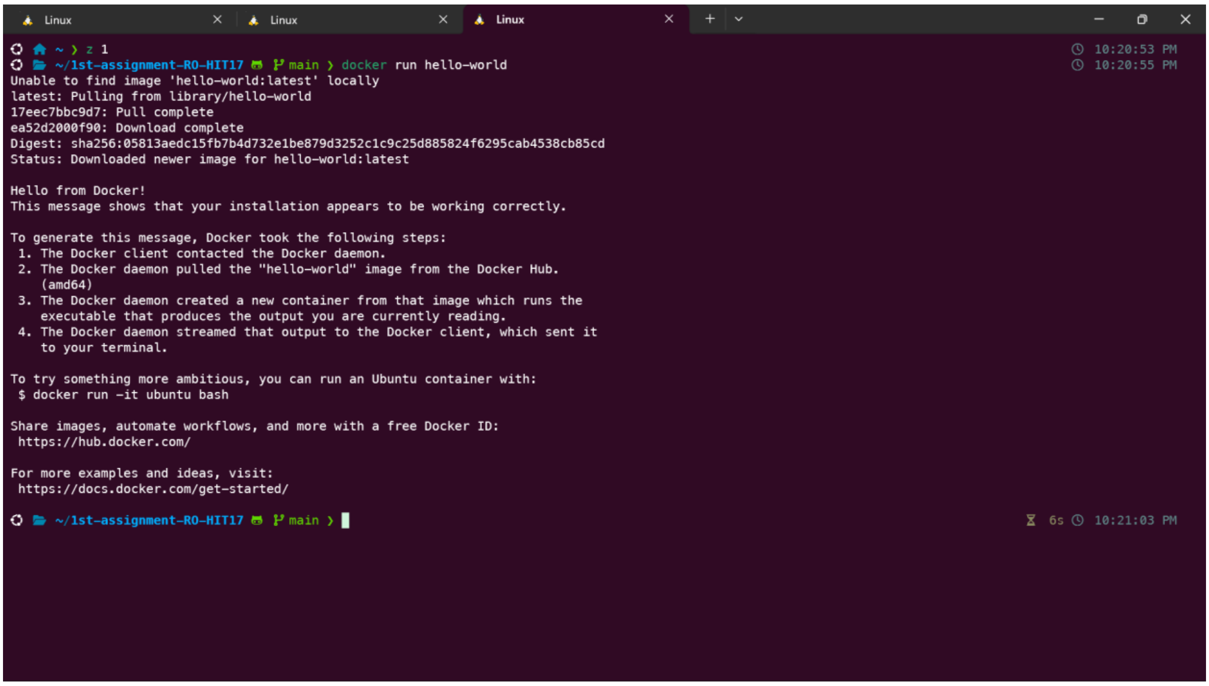
Step 2 – Start Docker Service

The Docker service was started and verified.

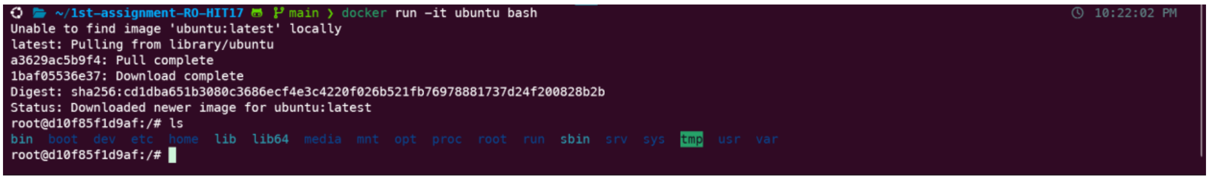
sudo systemctl start docker

docker –version

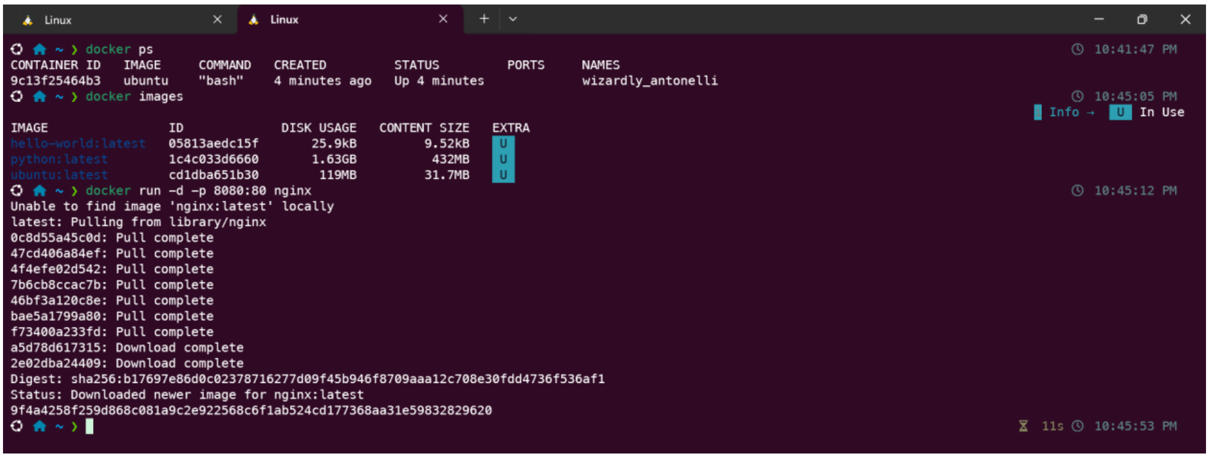
Step 3 – Create Containers



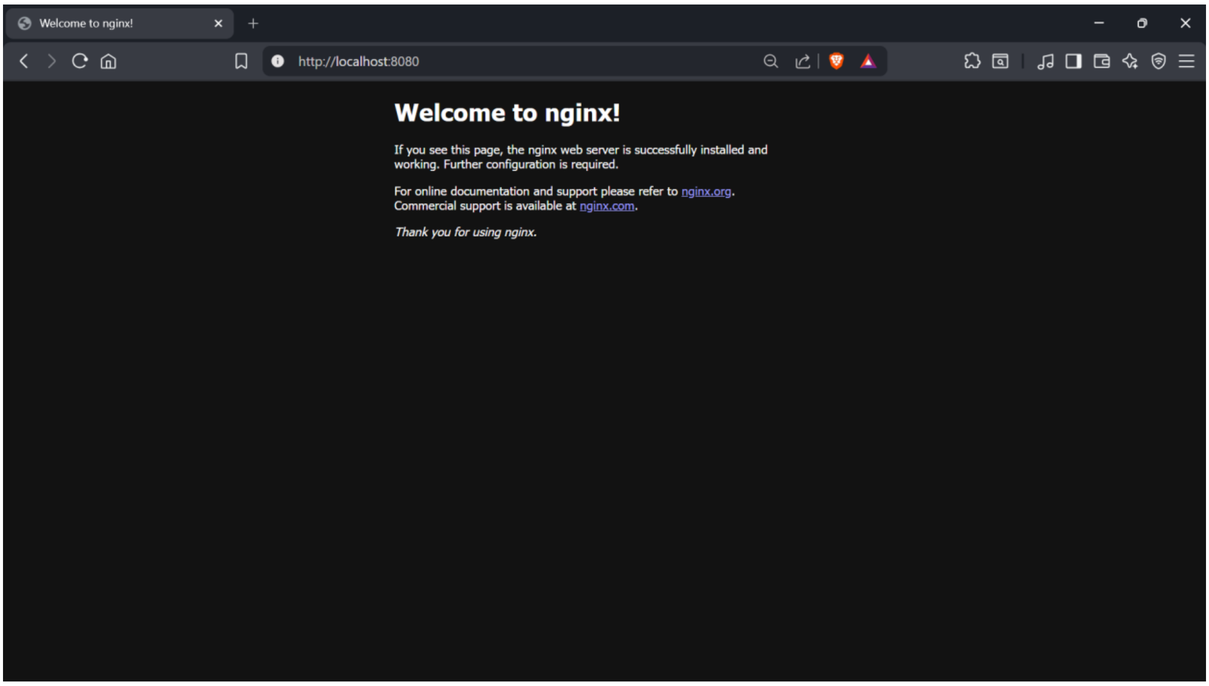
```
~ › z 1                                                                       10:20:53 PM
~/1st-assignment-RO-HIT17  main › docker run hello-world                     10:20:55 PM
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
17eec7bbc9d7: Pull complete
ea52d2000f90: Download complete
Digest: sha256:05813aedc15fb7b4d732e1be879d3252c1c9c25d885824f6295cab4538cb85cd
Status: Downloaded newer image for hello-world:latest

Hello from Docker!
This message shows that your installation appears to be working correctly.

To generate this message, Docker took the following steps:
 1. The Docker client contacted the Docker daemon.
 2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
    (amd64)
 3. The Docker daemon created a new container from that image which runs the
    executable that produces the output you are currently reading.
 4. The Docker daemon streamed that output to the Docker client, which sent it
    to your terminal.

To try something more ambitious, you can run an Ubuntu container with:
 $ docker run -it ubuntu bash

Share images, automate workflows, and more with a free Docker ID:
 https://hub.docker.com/

For more examples and ideas, visit:
 https://docs.docker.com/get-started/

~/1st-assignment-RO-HIT17  main ›                                       6s  10:21:03 PM
```



```
~/1st-assignment-RO-HIT17  main ❯ docker run -it ubuntu bash                                    10:22:02 PM
Unable to find image 'ubuntu:latest' locally
latest: Pulling from library/ubuntu
a3629ac5b9f4: Pull complete
1baf05536e37: Download complete
Digest: sha256:cd1dba651b3080c3686ecf4e3c4220f026b521fb76978881737d24f200828b2b
Status: Downloaded newer image for ubuntu:latest
root@d10f85f1d9af:/# ls
bin  boot  dev  etc  home  lib  lib64  media  mnt  opt  proc  root  run  sbin  srv  sys  tmp  usr  var
root@d10f85f1d9af:/# 
```



```
 ~ ❯ docker ps                                                                                   10:41:47 PM
CONTAINER ID   IMAGE    COMMAND   CREATED         STATUS         PORTS     NAMES
9c13f25464b3   ubuntu   "bash"    4 minutes ago   Up 4 minutes             wizardly_antonelli
 ~ ❯ docker images                                                                               10:45:05 PM
                                                                                          Info →  U  In Use
IMAGE                ID             DISK USAGE   CONTENT SIZE   EXTRA
hello-world:latest   05813aedc15f       25.9kB         9.52kB    U
python:latest        1c4c033d6660       1.63GB          432MB    U
ubuntu:latest        cd1dba651b30        119MB         31.7MB    U
 ~ ❯ docker run -d -p 8080:80 nginx                                                              10:45:12 PM
Unable to find image 'nginx:latest' locally
latest: Pulling from library/nginx
0c8d55a45c0d: Pull complete
47cd406a84ef: Pull complete
4f4efe02d542: Pull complete
7b6cb8ccac7b: Pull complete
46bf3a120c8e: Pull complete
bae5a1799a80: Pull complete
f73400a233fd: Pull complete
a5d78d617315: Download complete
2e02dba24409: Download complete
Digest: sha256:b17697e86d0c02378716277d09f45b946f8709aaa12c708e30fdd4736f536af1
Status: Downloaded newer image for nginx:latest
9f4a4258f259d868c081a9c2e922568c6f1ab524cd177368aa31e59832829620
 ~ ❯                                                                                      11s  10:45:53 PM
```



Welcome to nginx!

If you see this page, the nginx web server is successfully installed and working. Further configuration is required.

For online documentation and support please refer to nginx.org.
Commercial support is available at nginx.com.

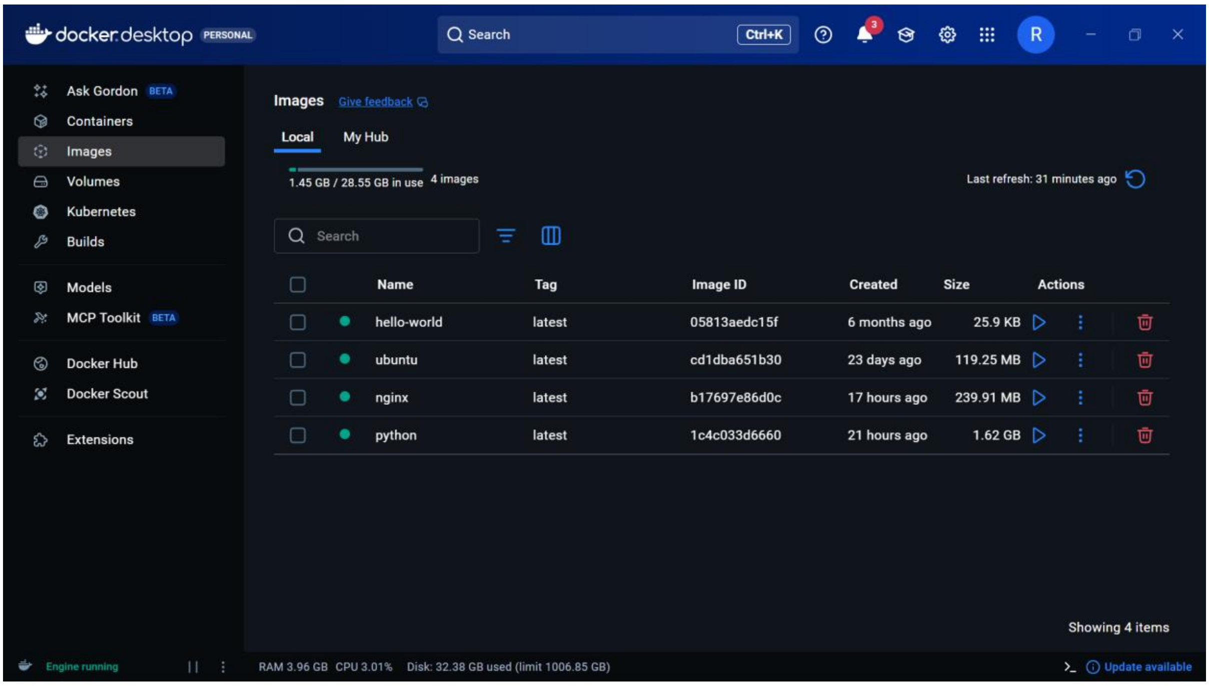
Thank you for using nginx.

Step 4 – View Docker Containers

All containers were listed to verify their status.

docker ps -a

This displayed running and stopped containers.



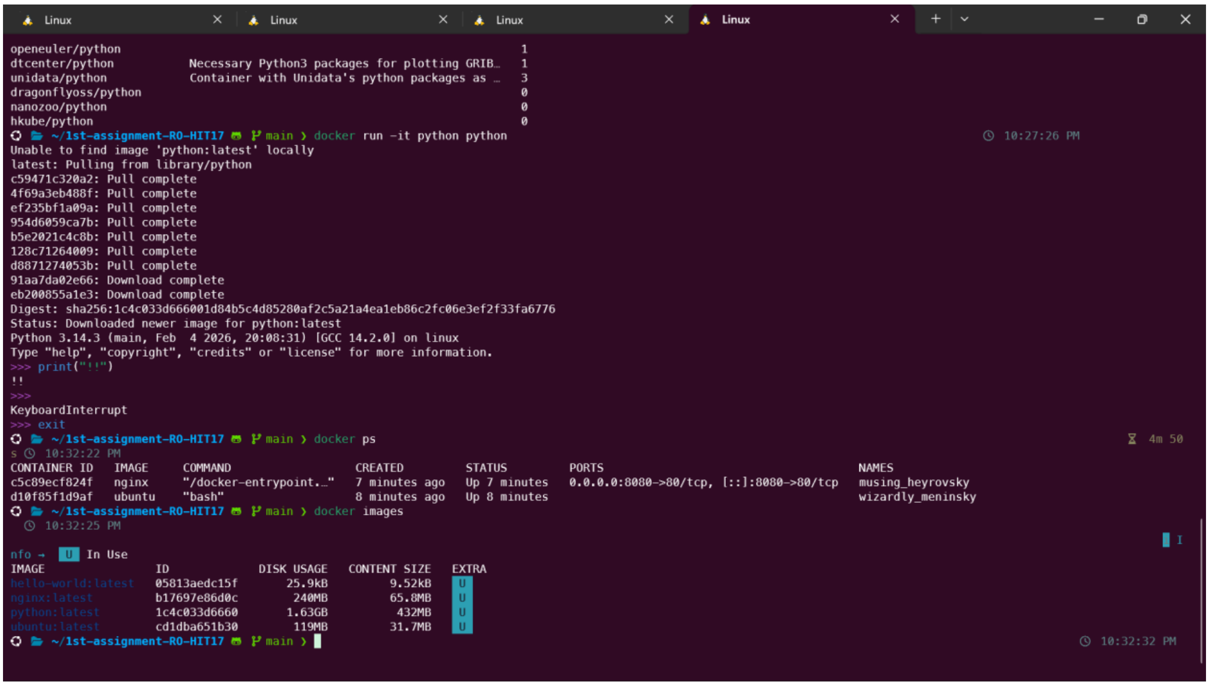
1.45 GB / 28.55 GB in use 4 images

Last refresh: 31 minutes ago

☐	Name	Tag	Image ID	Created	Size
☐	● hello-world	latest	05813aedc15f	6 months ago	25.9 KB
☐	● ubuntu	latest	cd1dba651b30	23 days ago	119.25 MB
☐	● nginx	latest	b17697e86d0c	17 hours ago	239.91 MB
☐	● python	latest	1c4c033d6660	21 hours ago	1.62 GB

Showing 4 items

RAM 3.96 GB CPU 3.01% Disk: 32.38 GB used (limit 1006.85 GB)



```
openeuler/python                                                          1
dtcenter/python          Necessary Python3 packages for plotting GRIB…    1
unidata/python           Container with Unidata's python packages as …    3
dragonflyoss/python                                                       0
nanozoo/python                                                            0
hkube/python                                                              0
~/1st-assignment-RO-HIT17  main ❯ docker run -it python python                                        10:27:26 PM
Unable to find image 'python:latest' locally
latest: Pulling from library/python
c59471c320a2: Pull complete
4f69a3eb488f: Pull complete
ef235bf1a09a: Pull complete
954d6059ca7b: Pull complete
b5e2021c4c8b: Pull complete
128c71264009: Pull complete
d8871274053b: Pull complete
91aa7da02e66: Download complete
eb200855a1e3: Download complete
Digest: sha256:1c4c033d666001d84b5c4d85280af2c5a21a4ea1eb86c2fc06e3ef2f33fa6776
Status: Downloaded newer image for python:latest
Python 3.14.3 (main, Feb  4 2026, 20:08:31) [GCC 14.2.0] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> print("!!")
!!
>>>
KeyboardInterrupt
>>> exit
~/1st-assignment-RO-HIT17  main ❯ docker ps                                                                       4m 50
s  10:32:22 PM
CONTAINER ID   IMAGE     COMMAND                  CREATED         STATUS         PORTS                                     NAMES
c5c89ecf824f   nginx     "/docker-entrypoint.…"   7 minutes ago   Up 7 minutes   0.0.0.0:8080->80/tcp, [::]:8080->80/tcp   musing_heyrovsky
d10f85f1d9af   ubuntu    "bash"                   8 minutes ago   Up 8 minutes                                             wizardly_meninsky
~/1st-assignment-RO-HIT17  main ❯ docker images
  10:32:25 PM
                                                                                                                   I
nfo →  U  In Use
IMAGE                ID             DISK USAGE   CONTENT SIZE   EXTRA
hello-world:latest   05813aedc15f       25.9kB         9.52kB    U
nginx:latest         b17697e86d0c        240MB         65.8MB    U
python:latest        1c4c033d6660       1.63GB          432MB    U
ubuntu:latest        cd1dba651b30        119MB         31.7MB    U
~/1st-assignment-RO-HIT17  main ❯                                                                              10:32:32 PM
```

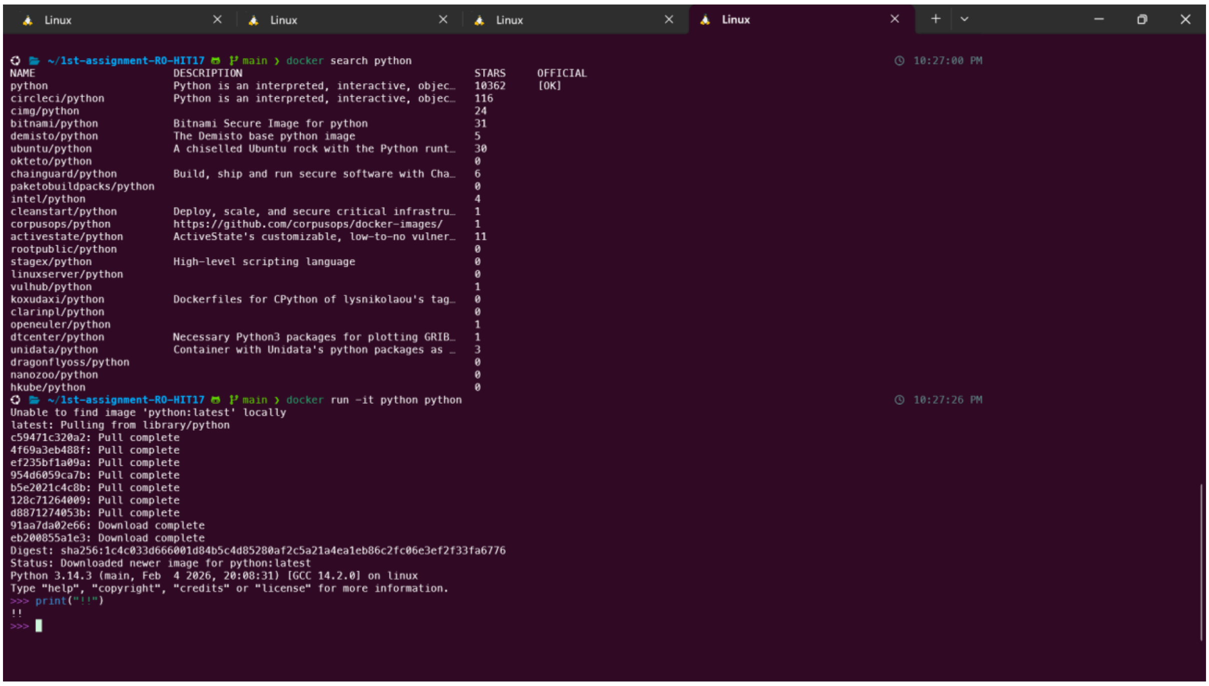
Step 5 – Run Python Container

A Python development container was launched.

docker run -it python:3.11-slim bash

python3

Python executed successfully inside the container.



```
~/1st-assignment-RO-HIT17  main › docker search python                                                      10:27:00 PM
NAME                      DESCRIPTION                                     STARS     OFFICIAL
python                    Python is an interpreted, interactive, objec…   10362     [OK]
circleci/python           Python is an interpreted, interactive, objec…   116
cimg/python                                                               24
bitnami/python            Bitnami Secure Image for python                 31
demisto/python            The Demisto base python image                   5
ubuntu/python             A chiselled Ubuntu rock with the Python runt…   30
okteto/python                                                             0
chainguard/python         Build, ship and run secure software with Cha…   6
paketobuildpacks/python                                                   0
intel/python                                                              4
cleanstart/python         Deploy, scale, and secure critical infrastru…   1
corpusops/python          https://github.com/corpusops/docker-images/     1
activestate/python        ActiveState's customizable, low-to-no vulner…   11
rootpublic/python                                                         0
stagex/python             High-level scripting language                   0
linuxserver/python                                                        0
vulhub/python                                                             1
koxudaxi/python           Dockerfiles for CPython of lysnikolaou's tag…   0
clarinpl/python                                                           0
openeuler/python                                                          1
dtcenter/python           Necessary Python3 packages for plotting GRIB…   1
unidata/python            Container with Unidata's python packages as …   3
dragonflyoss/python                                                       0
nanozoo/python                                                            0
hkube/python                                                              0
~/1st-assignment-RO-HIT17  main › docker run -it python python                                              10:27:26 PM
Unable to find image 'python:latest' locally
latest: Pulling from library/python
c59471c320a2: Pull complete
4f69a3eb488f: Pull complete
ef235bf1a09a: Pull complete
954d6059ca7b: Pull complete
b5e2021c4c8b: Pull complete
128c71264009: Pull complete
d8871274053b: Pull complete
91aa7da02e66: Download complete
eb200855a1e3: Download complete
Digest: sha256:1c4c033d666001d84b5c4d85280af2c5a21a4ea1eb86c2fc06e3ef2f33fa6776
Status: Downloaded newer image for python:latest
Python 3.14.3 (main, Feb  4 2026, 20:08:31) [GCC 14.2.0] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> print("!!")
!!
>>>
```

Output

- Docker Engine installed successfully.
- Containers were created and executed without errors.
- Python environment functioned correctly inside Docker.

Result

Docker was successfully installed and configured in WSL. Multiple containers were created and managed, and a Python runtime environment was executed inside a Docker container, demonstrating effective containerization.