

**Experiment No.: 05**

**Title:** Running an application in a container, Docker and  
Docker Hub

**Aim:** To installed Docker, pull and run images from Docker Hub, modify containers to run an application and push it on the Docker Hub

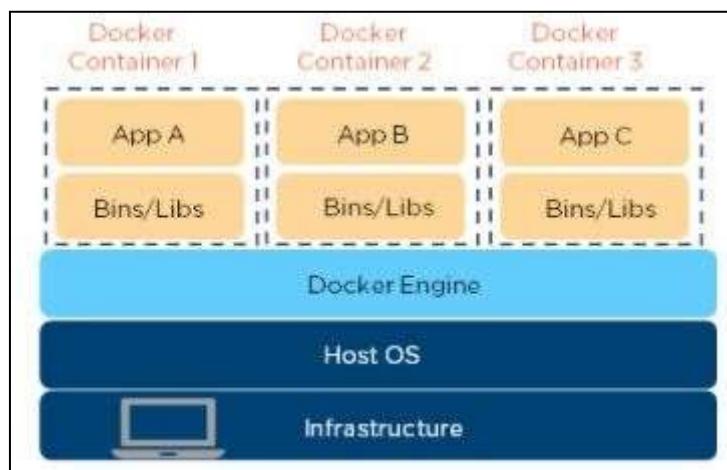
---

**Resources needed:** Docker Hub Account

---

### Theory:

**Docker** is an OS-level virtualization software platform that helps users in building and managing applications in the Docker environment with all its library dependencies.



**Docker image** is a read-only, inert template that comes with instructions. In Docker, everything basically revolves around images. An image consists of a collection of files (or layers) that pack together all the necessities—such as dependencies, source code, and libraries—needed to set up a completely functional container environment. Images are stored on a Docker registry, such as the Docker Hub, or on a local registry.

**Docker Container** is a lightweight software package that includes all the dependencies (frameworks, libraries, etc.) required to execute an application. Running image is the container.

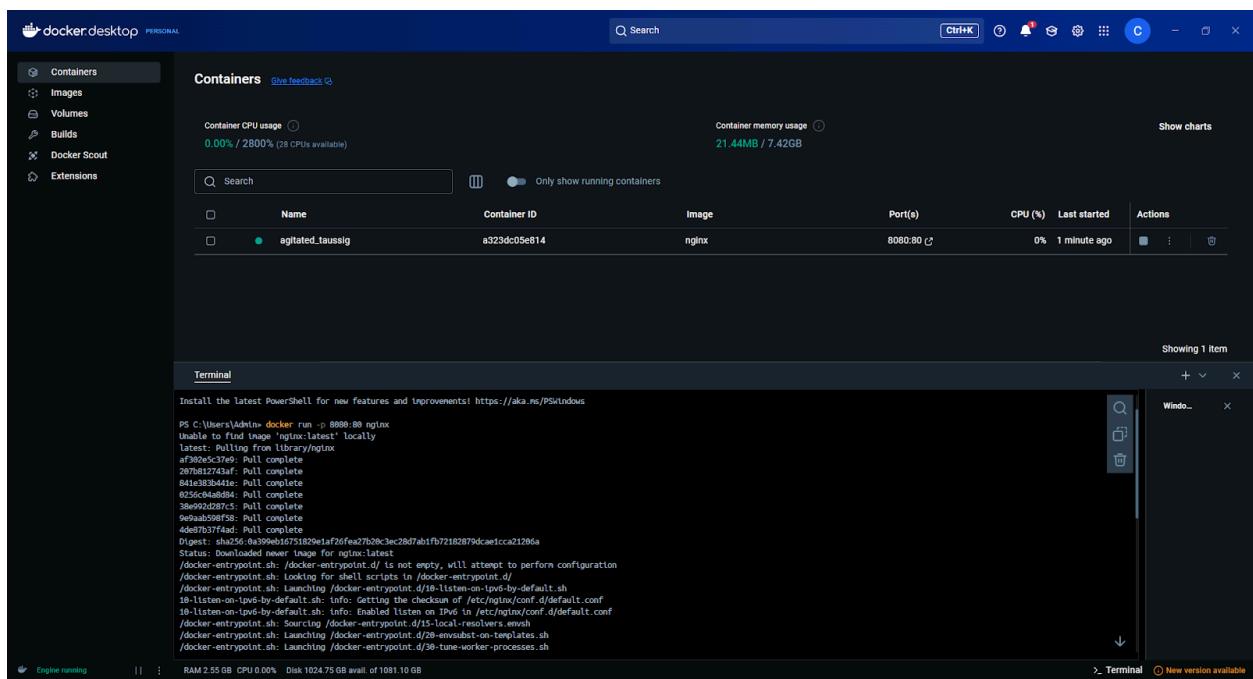
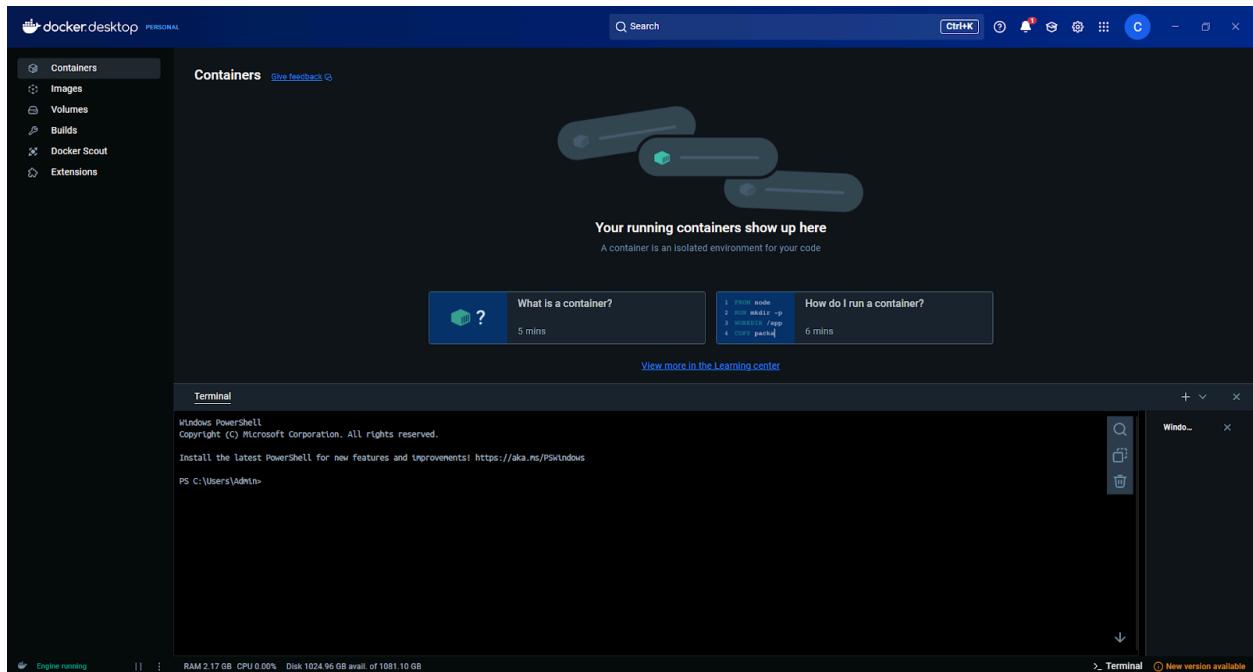
---

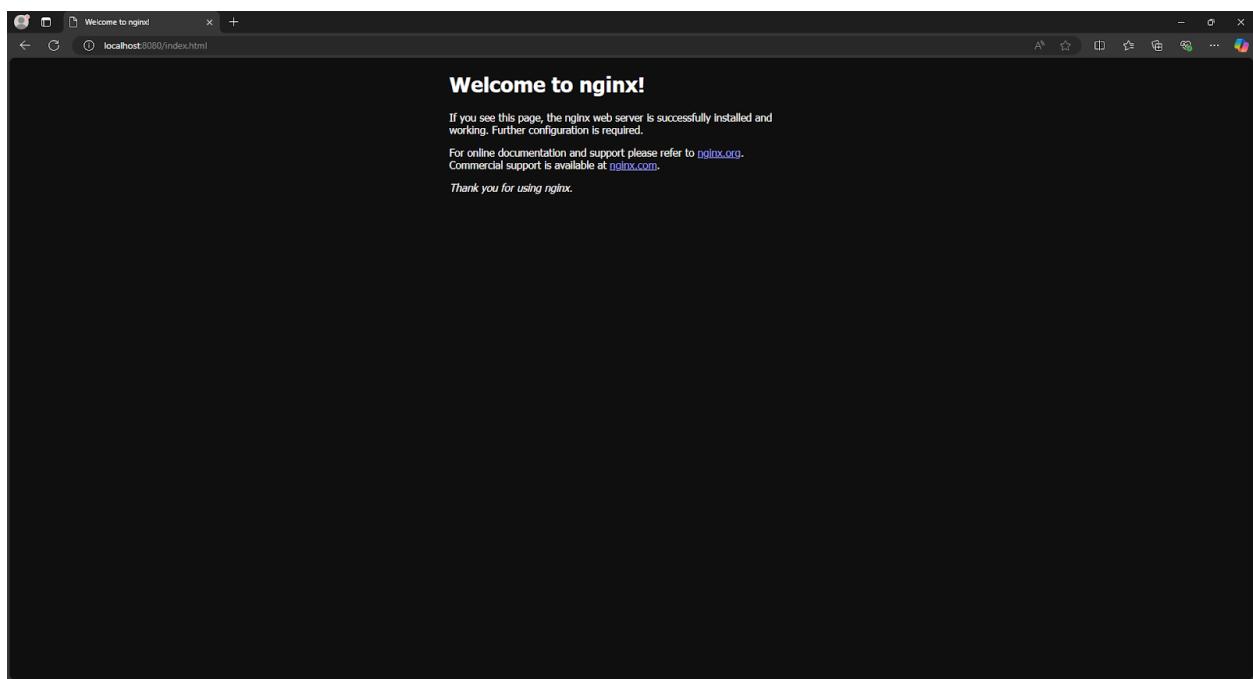
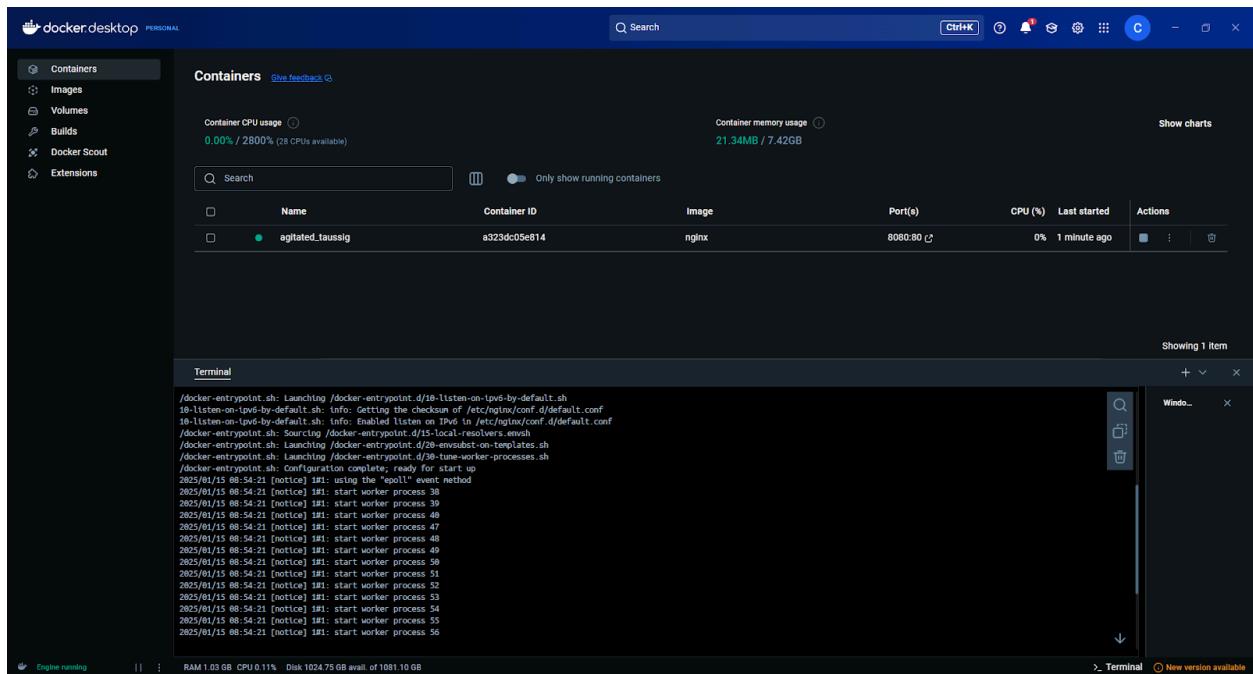
### Procedure:

1. Create Account on Docker Hub
2. Install Docker and explore Docker commands on windows/VM Linux AWS
3. Pull Nginx web server image and set the port
4. Check working of Nginx container on local host/live on browser(if it is VM)
5. Push Nginx image on your Docker Hub
6. Repeat the same for **two** other images of your choice to run an application/program.  
[Hello world, Ubuntu etc.]

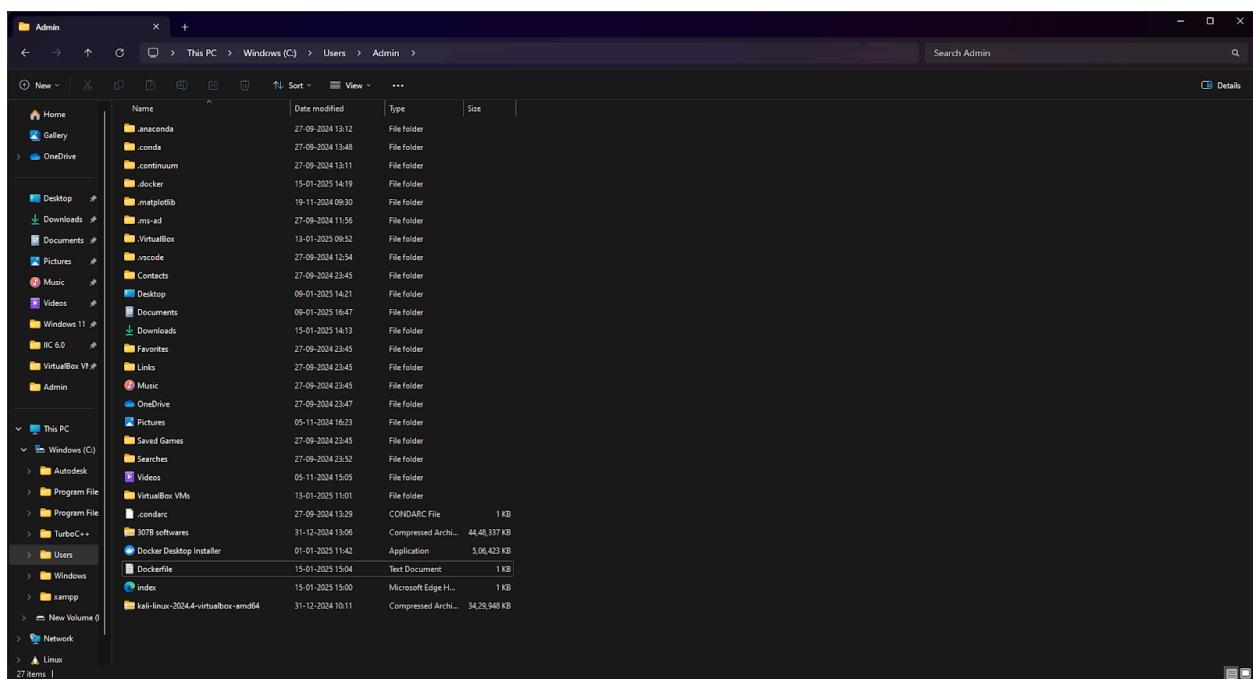
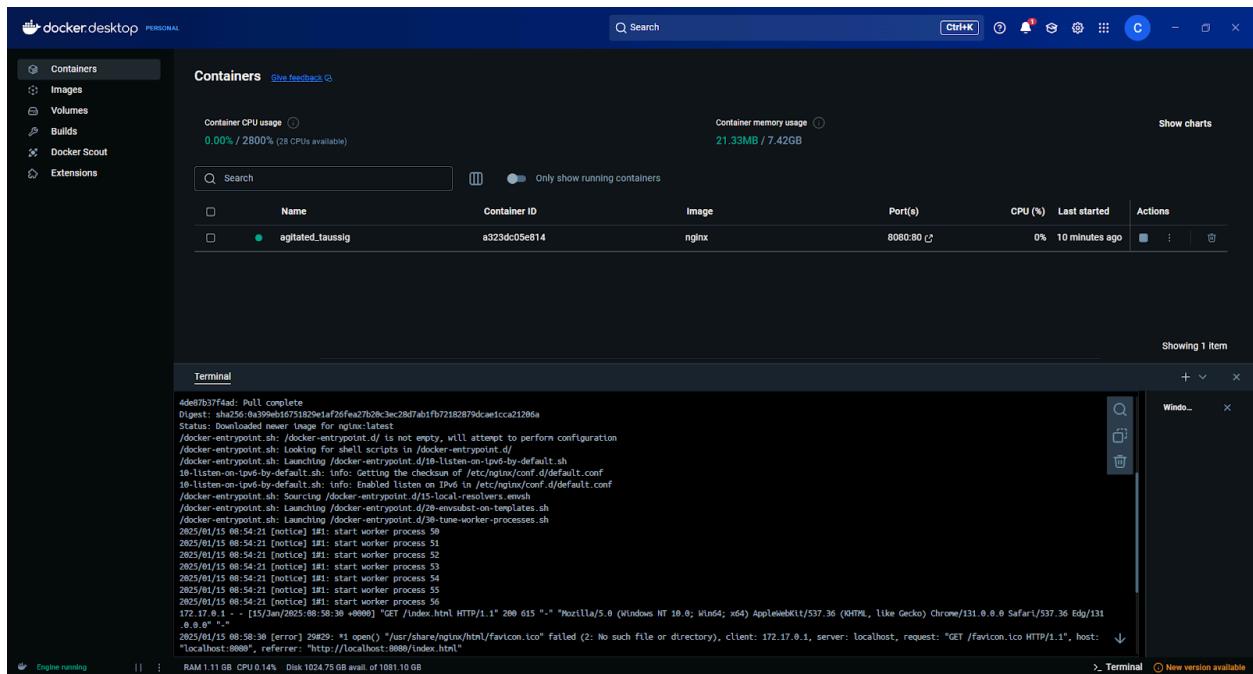
## Results: (Document with screenshots)

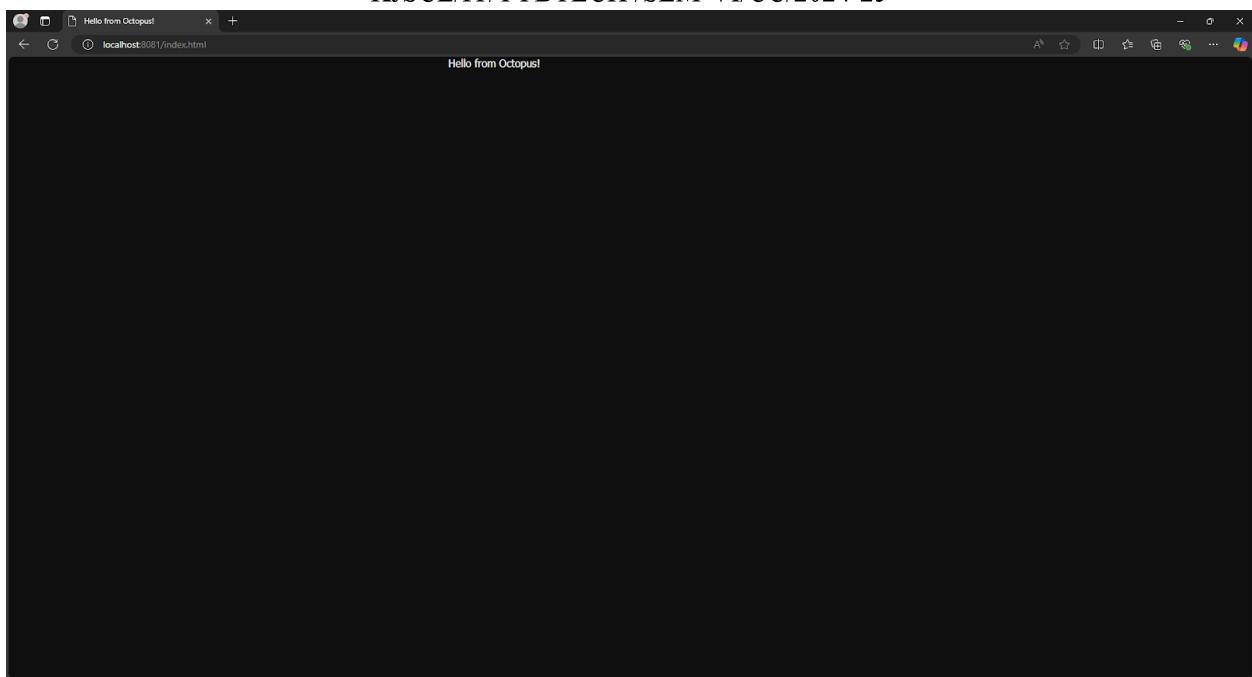
1. All steps to Create Docker Hub Account and install Docker
2. 10 Docker commands
3. All commands to pull images, set path, modify, website hosting and push
4. Updated Docker hub repository (before push and after push)



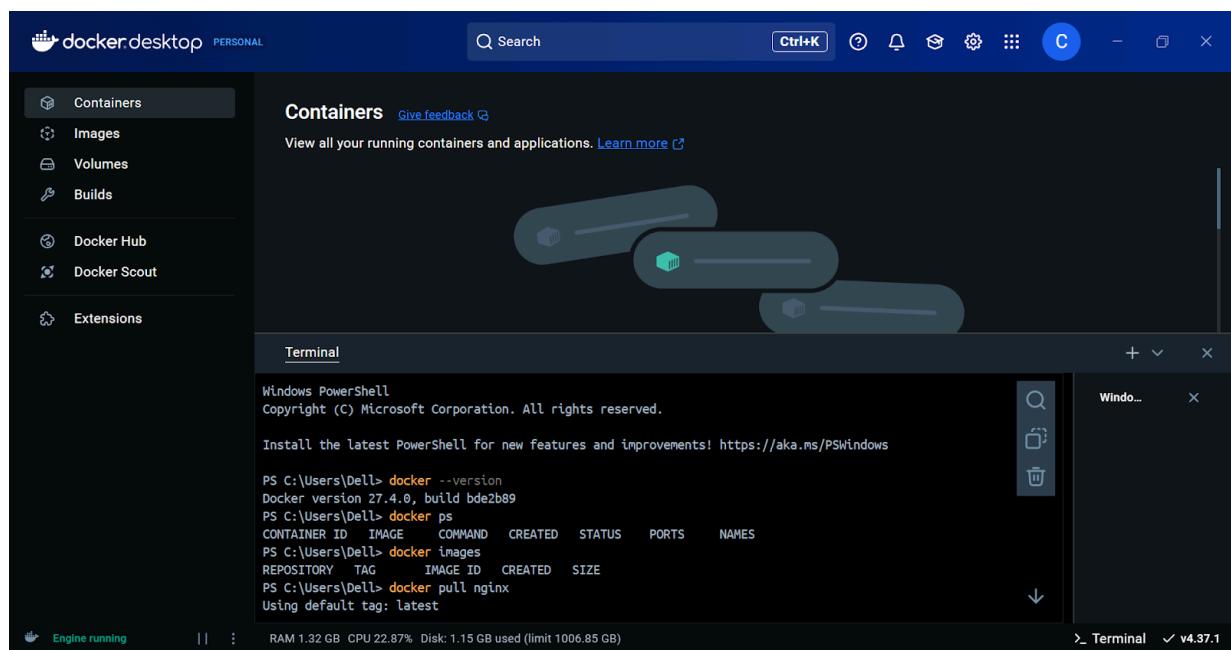


# KJSCE/IT/TYBTECH /SEM-VI/CC/2024-25

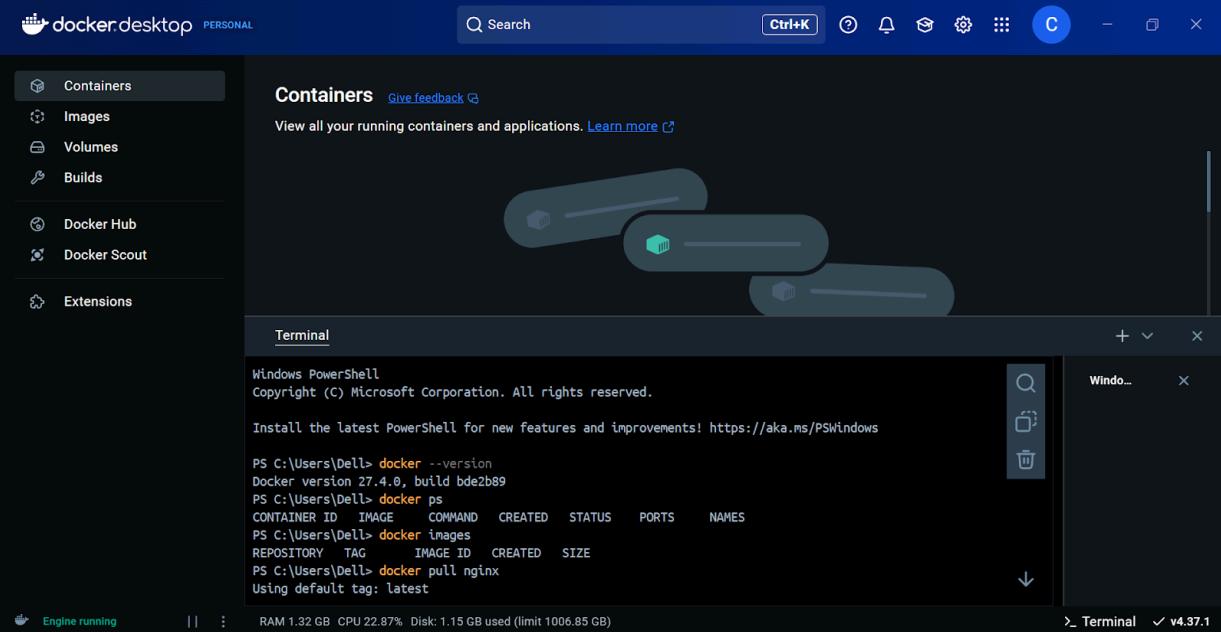




## Create an Account on Docker Hub Install Docker and Explore Docker Commands



## Pull NGINX Web Server Image and Set the Port



The screenshot shows the Docker Desktop interface on a Windows system. The left sidebar has 'Containers' selected. The main area is titled 'Containers' with a 'Give feedback' link. Below it says 'View all your running containers and applications. [Learn more](#)'. A central graphic features three blue cylinders with white icons. The bottom section is a terminal window titled 'Terminal'.

```

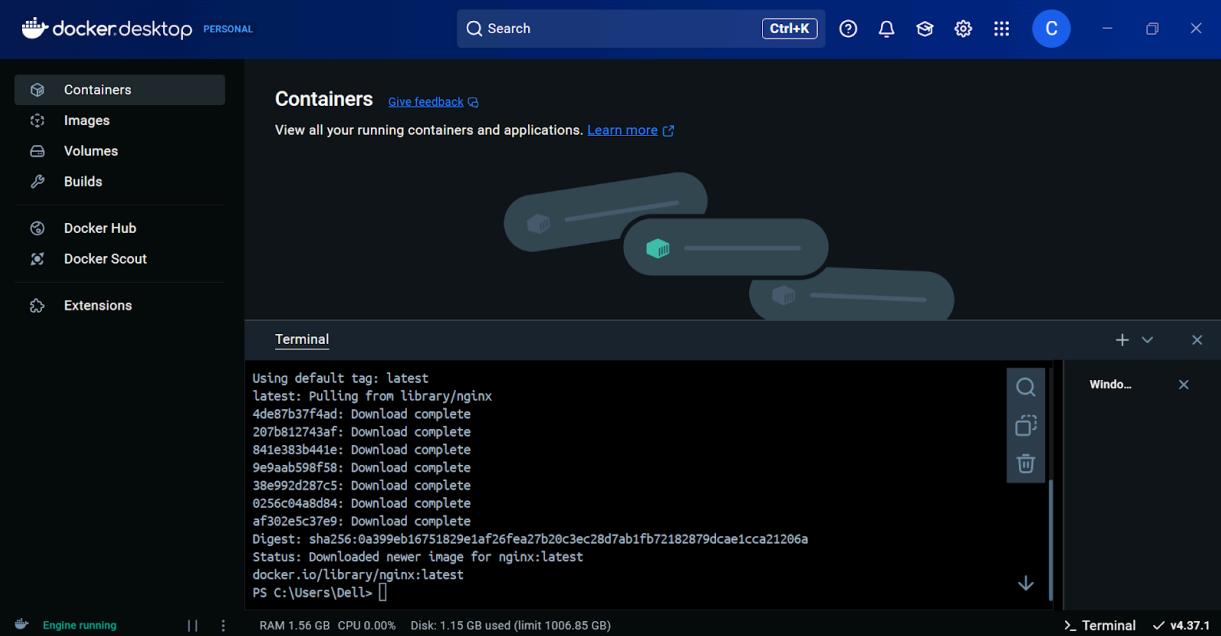
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\Del...> docker --version
Docker version 27.4.0, build bde2b89
PS C:\Users\Del...> docker ps
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
PS C:\Users\Del...> docker images
REPOSITORY TAG IMAGE ID CREATED SIZE
PS C:\Users\Del...> docker pull nginx
Using default tag: latest

```

At the bottom of the terminal window, it says 'RAM 1.32 GB CPU 22.87% Disk: 1.15 GB used (limit 1006.85 GB)' and 'Terminal ✓ v4.37.1'.



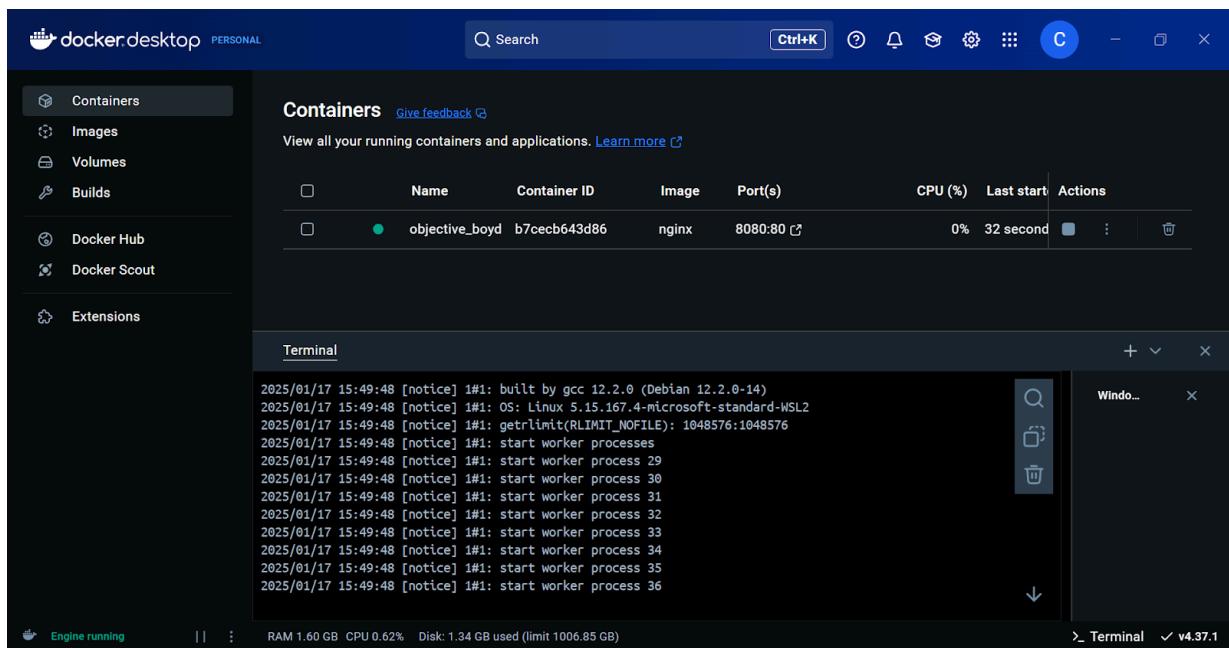
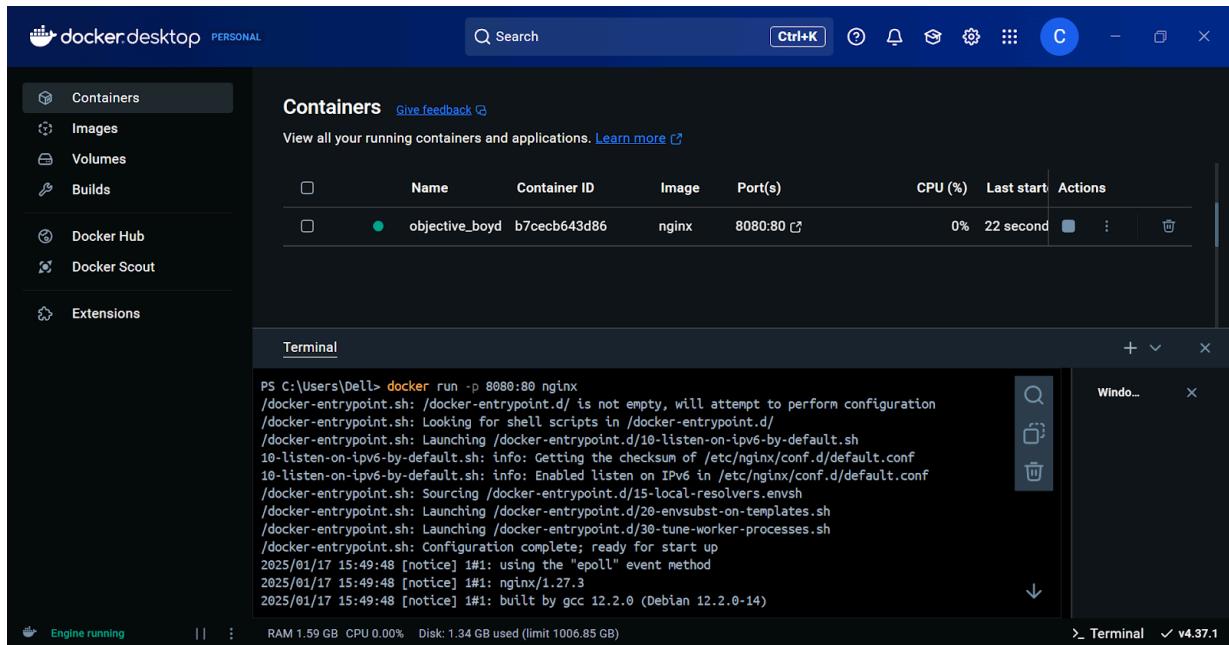
This screenshot shows the same Docker Desktop interface after the NGINX image has been pulled. The terminal window now displays the progress of the download:

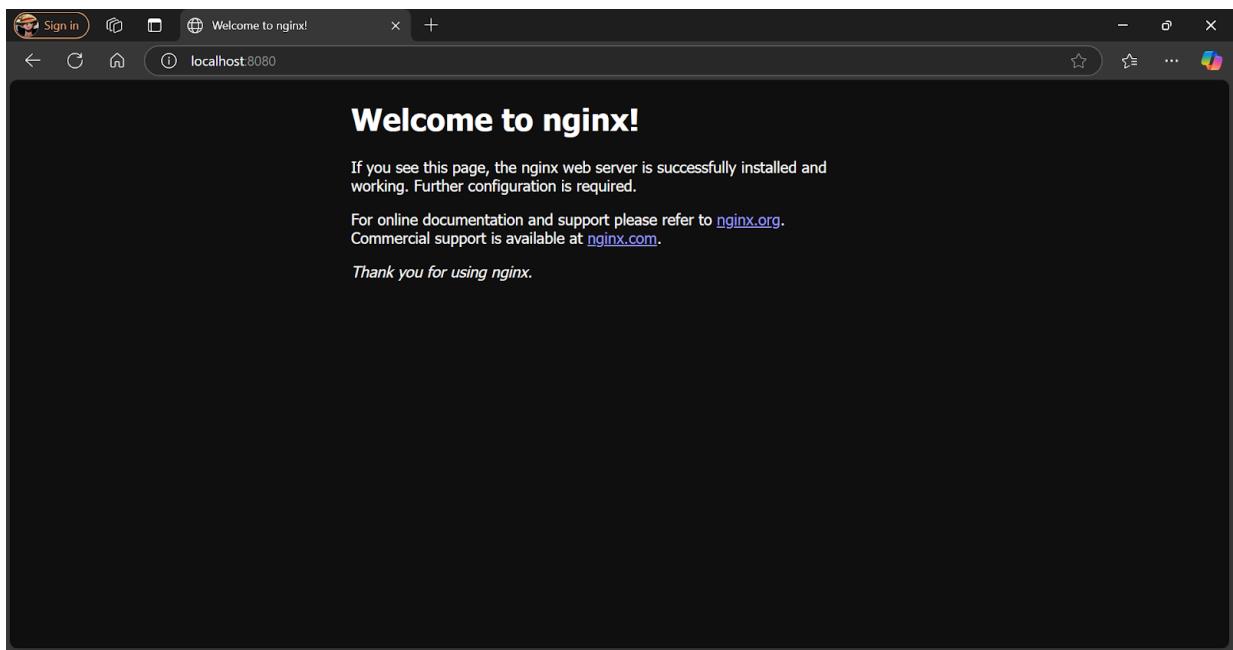
```

Using default tag: latest
latest: Pulling from library/nginx
4de87b37f4ad: Download complete
207b812743af: Download complete
841e383b3441e: Download complete
9e9aab598f58: Download complete
38e992d287c5: Download complete
0256c04a8d84: Download complete
af302e5c37e9: Download complete
Digest: sha256:0a399eb16751b29e1af26fea27b20c3ec28d7ab1fb72182879dc1cca21206a
Status: Downloaded newer image for nginx:latest
docker.io/library/nginx:latest
PS C:\Users\Del...>

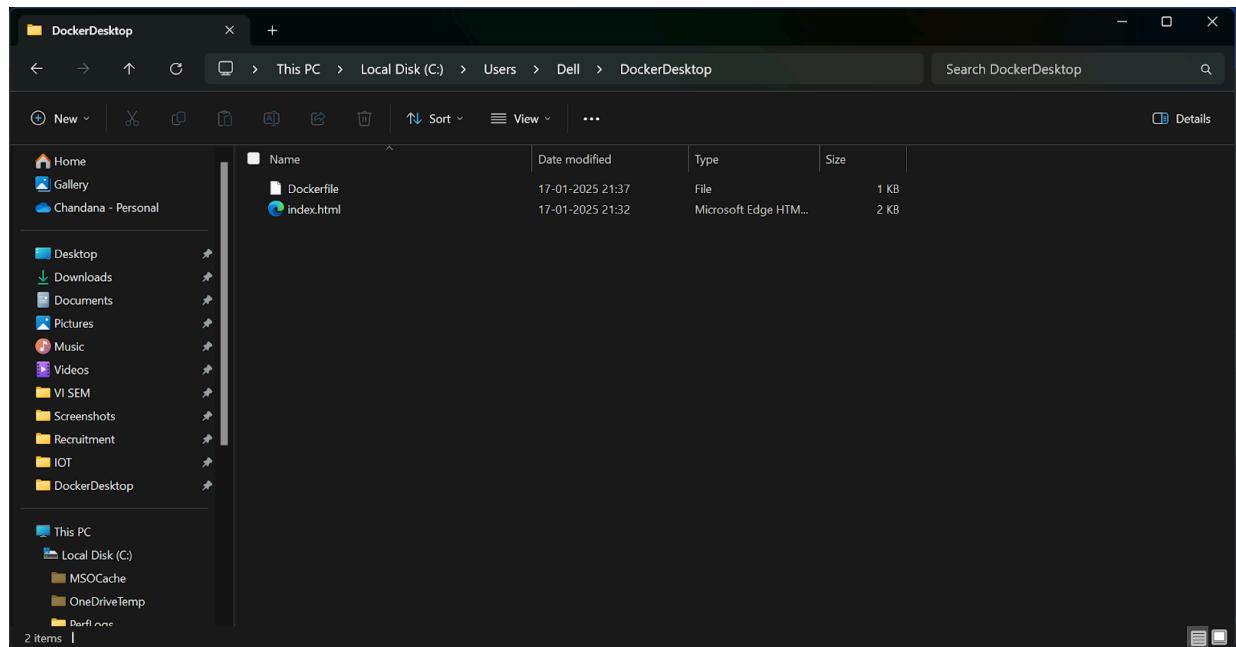
```

The status bar at the bottom shows 'RAM 1.56 GB CPU 0.00% Disk: 1.15 GB used (limit 1006.85 GB)' and 'Terminal ✓ v4.37.1'.





## Modify the NGINX Container



```

<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>2nd Attempt</title>
    <style>
        @import url('https://fonts.googleapis.com/css2?family=Roboto:wght@400;700&display=swap');
        body {
            margin: 0;
            font-family: 'Roboto', sans-serif;
            background: linear-gradient(135deg, #1e1e1e, #333);
            color: #e0e0e0;
            display: flex;
            justify-content: center;
            align-items: center;
            height: 100vh;
            flex-direction: column;
            text-align: center;
        }
        h1 {
            font-size: 3.5rem;
            font-weight: bold;
            color: #ff4f5a;
            text-shadow: 4px 4px 8px #rgba(0, 0, 0, 0.6);
        }
        h2 {
            font-size: 2rem;
            font-weight: 400;
            color: #fa834a;
            text-shadow: 2px 2px 6px #rgba(0, 0, 0, 0.5);
        }
    </style>
</head>
<body>
<h1>Hello</h1>
<h2>2nd Attempt</h2>
</body>
</html>

```

This screenshot shows a code editor window with the file 'index.html' open. The code defines a dark-themed landing page with a central title and subtitle. It includes a link to a Google Fonts CSS file for the Roboto font. The editor interface has a dark theme with various icons for file operations and status indicators at the bottom.

```

<!DOCTYPE html>
<html lang="en">
<head>
    <style>
        h1, h2 {
            margin: 0;
            padding: 10px;
        }
        @media (max-width: 600px) {
            h1 {
                font-size: 2.8rem;
            }
            h2 {
                font-size: 1.5rem;
            }
        }
    </style>
</head>
<body>
    <h1>Hello from Chandana Galgalil</h1>
    <h2>This is my 2nd attempt at creating a custom NGINX image.</h2>
</body>
</html>

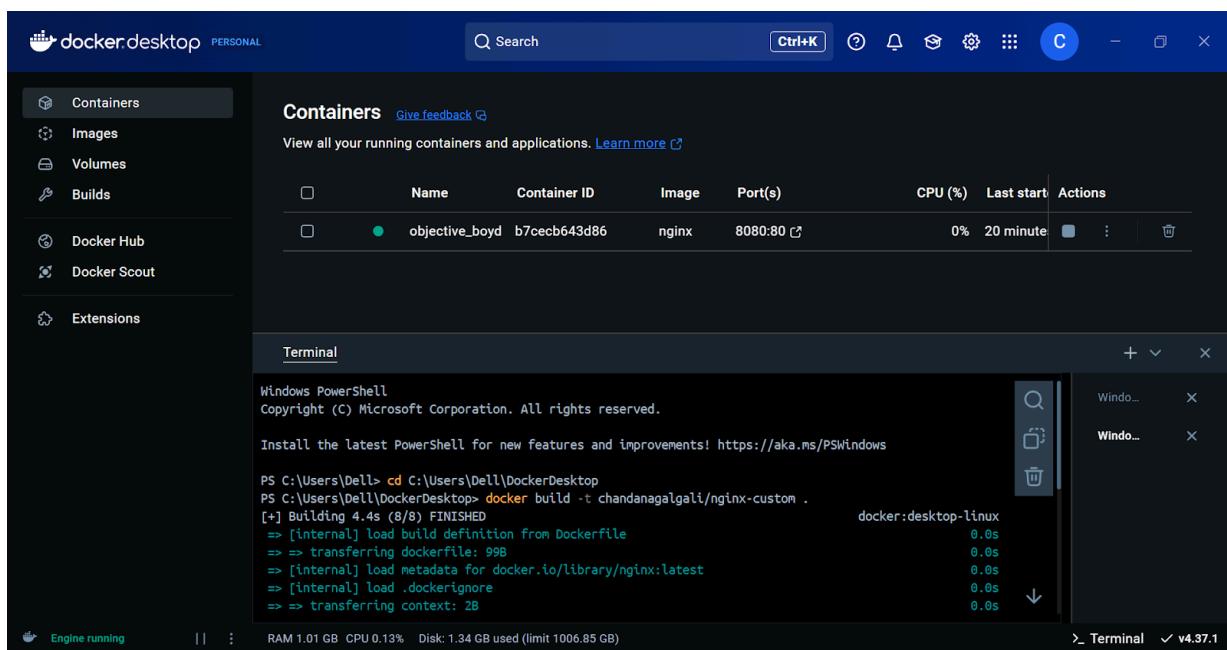
```

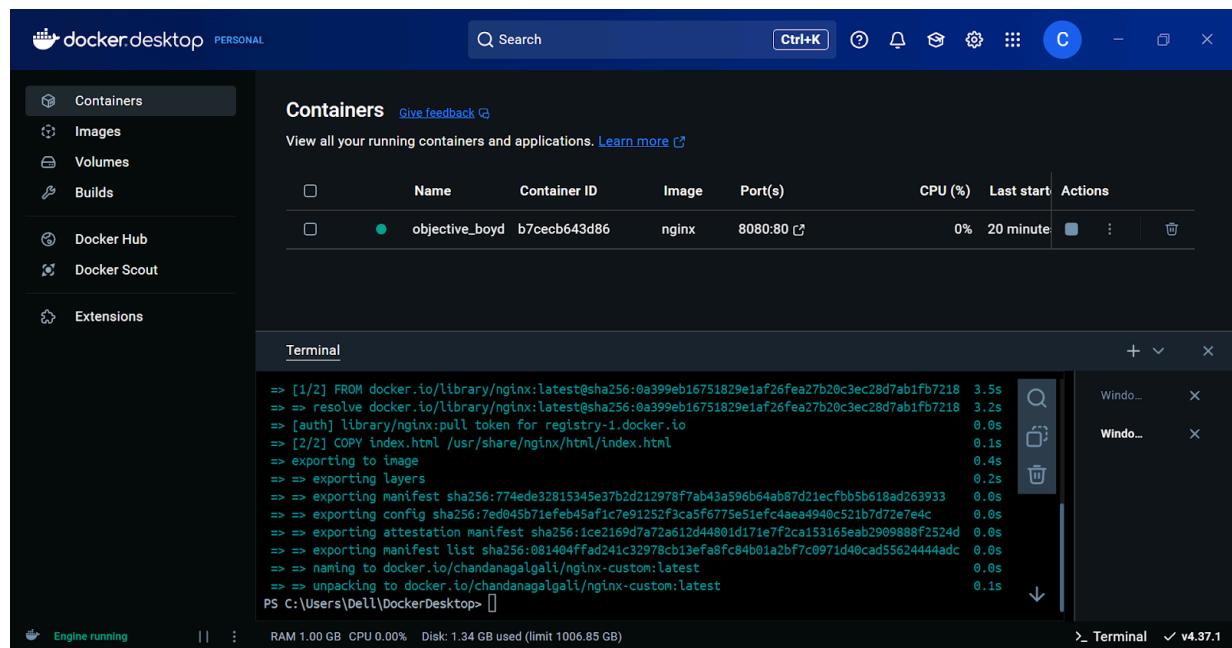
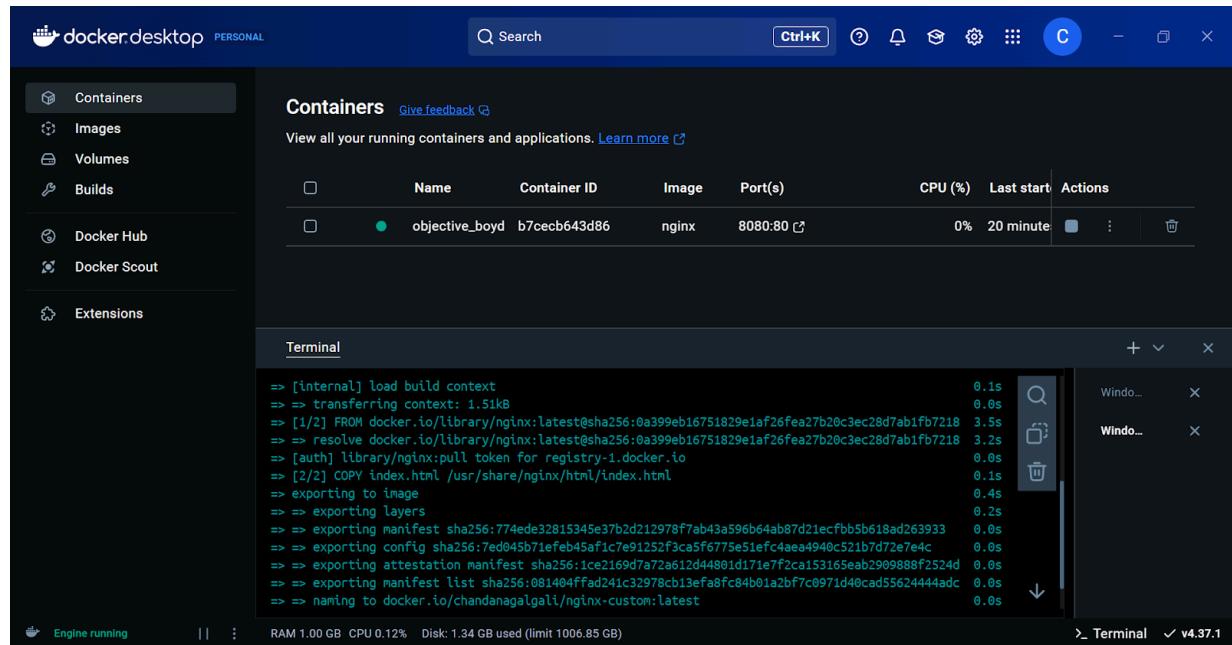
This screenshot shows the same 'index.html' file after modifications. It now includes a media query for screens up to 600px wide, adjusting the font sizes of the main heading (h1) and secondary heading (h2). Additionally, the page contains two dynamic content blocks: 'Hello from Chandana Galgalil' and 'This is my 2nd attempt at creating a custom NGINX image.' The code editor's interface remains consistent with the first screenshot.

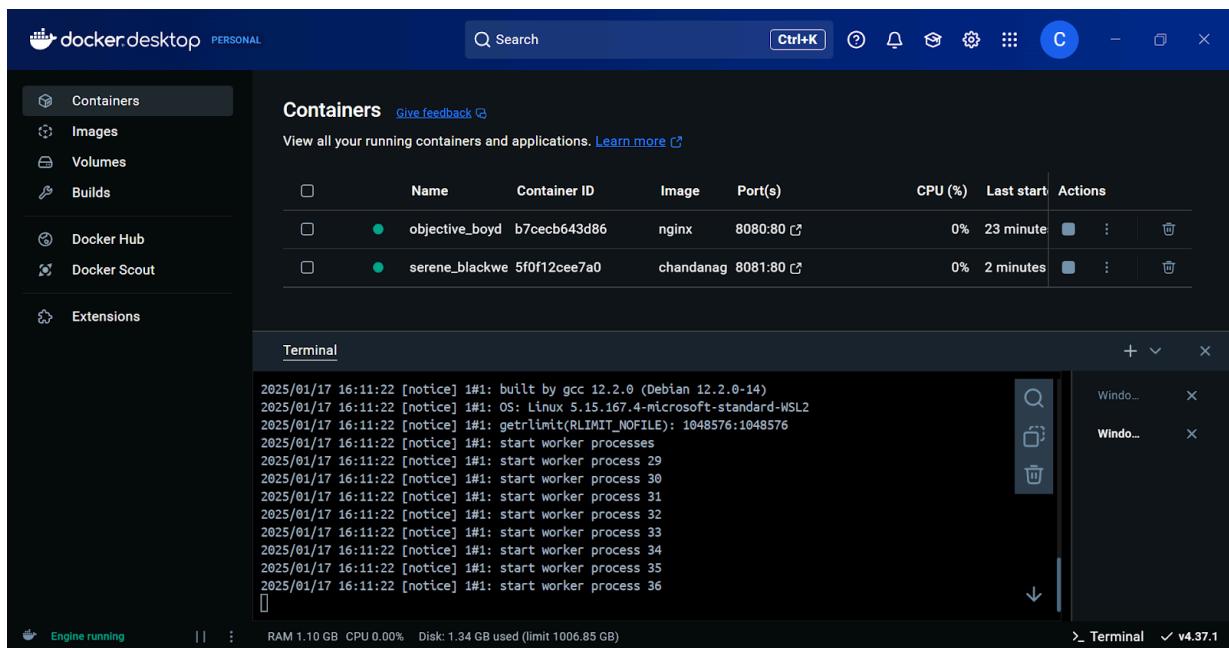
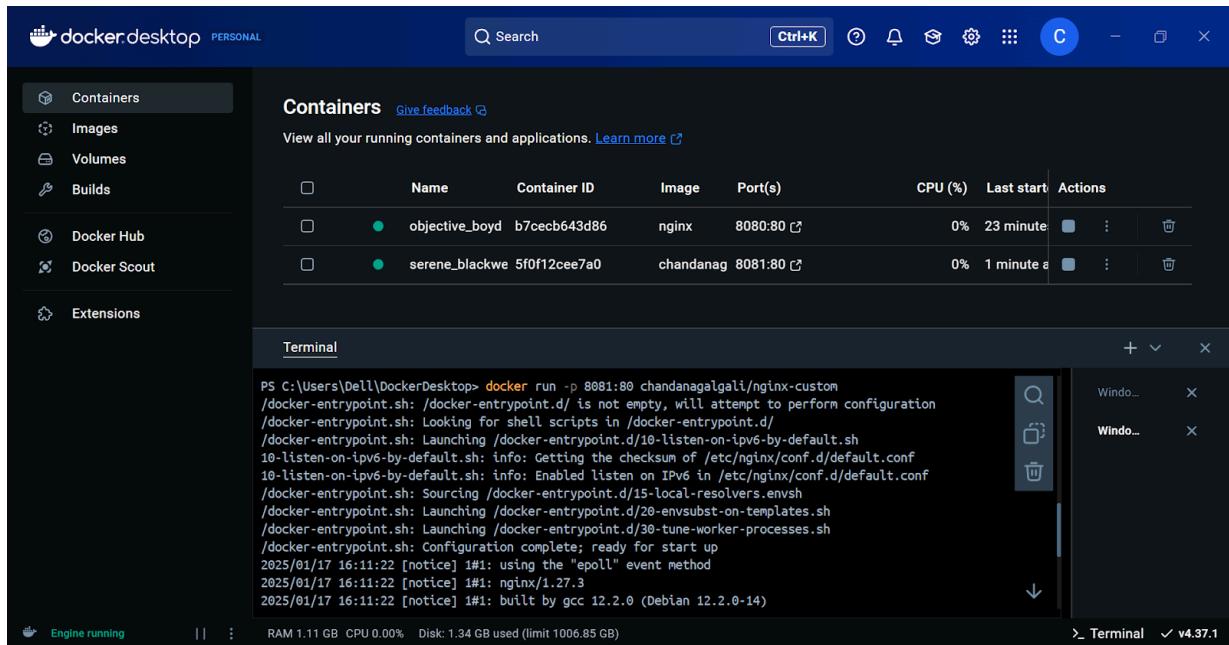
A screenshot of a code editor window titled "Dockerfile". The file contains the following Dockerfile content:

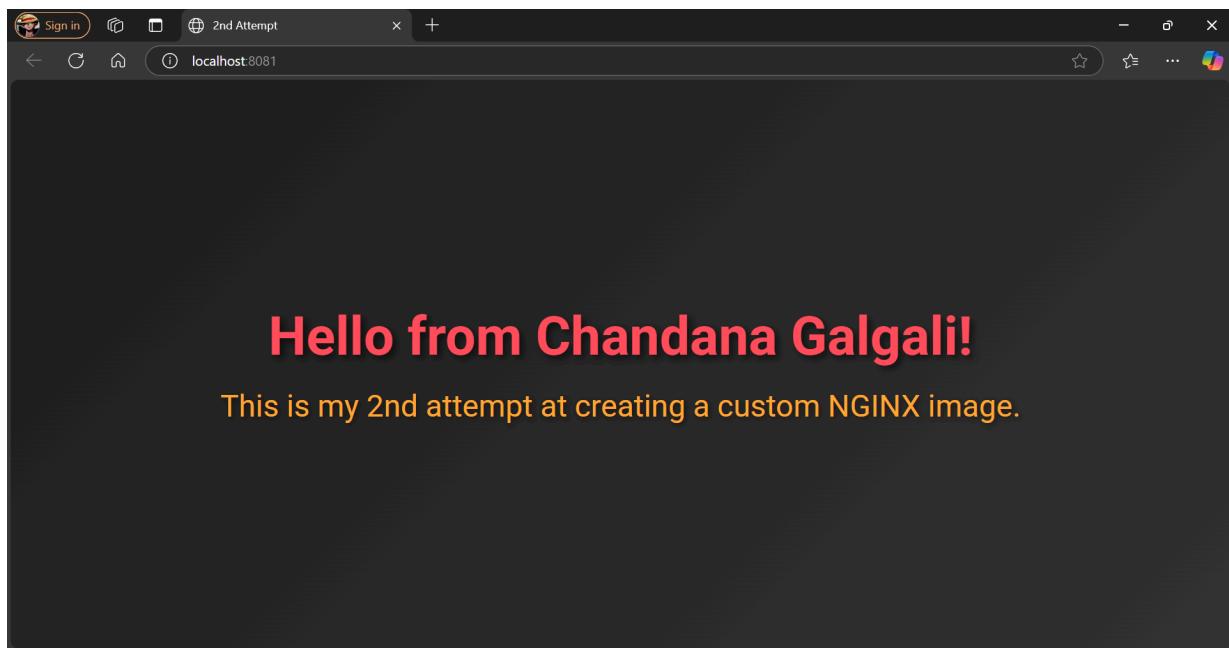
```
FROM nginx
COPY index.html /usr/share/nginx/html/index.html
```

The status bar at the bottom shows "Ln 1, Col 1 | 60 characters" and "Windows (CRLF) | UTF-8".



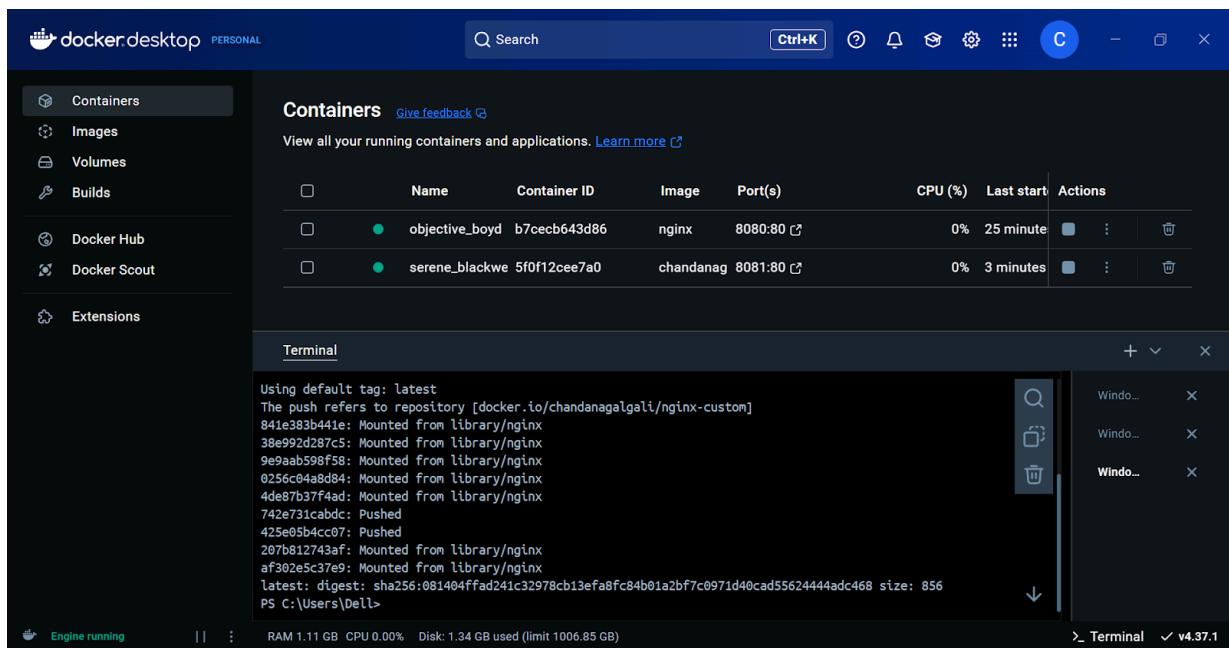




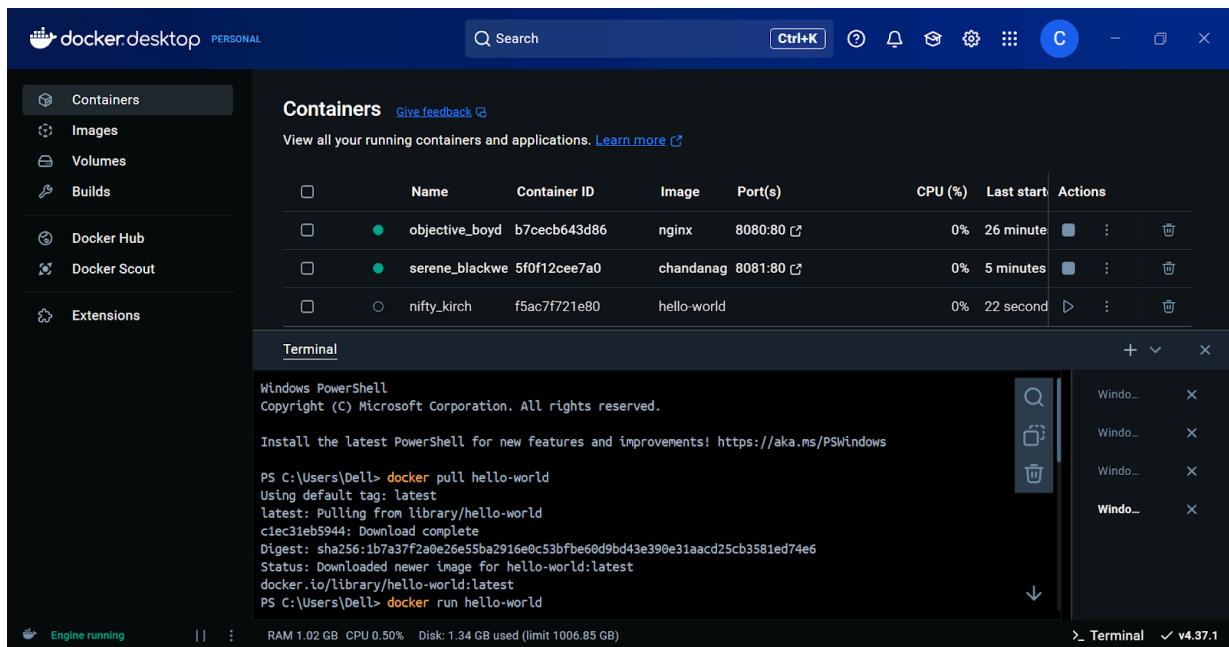


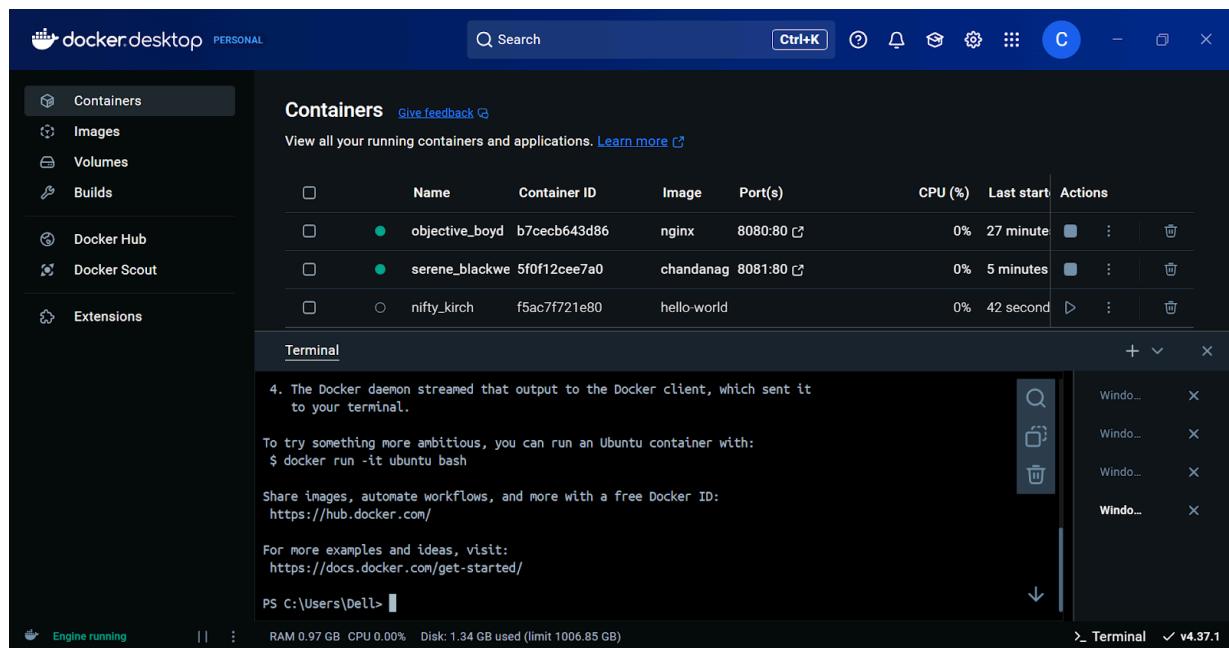
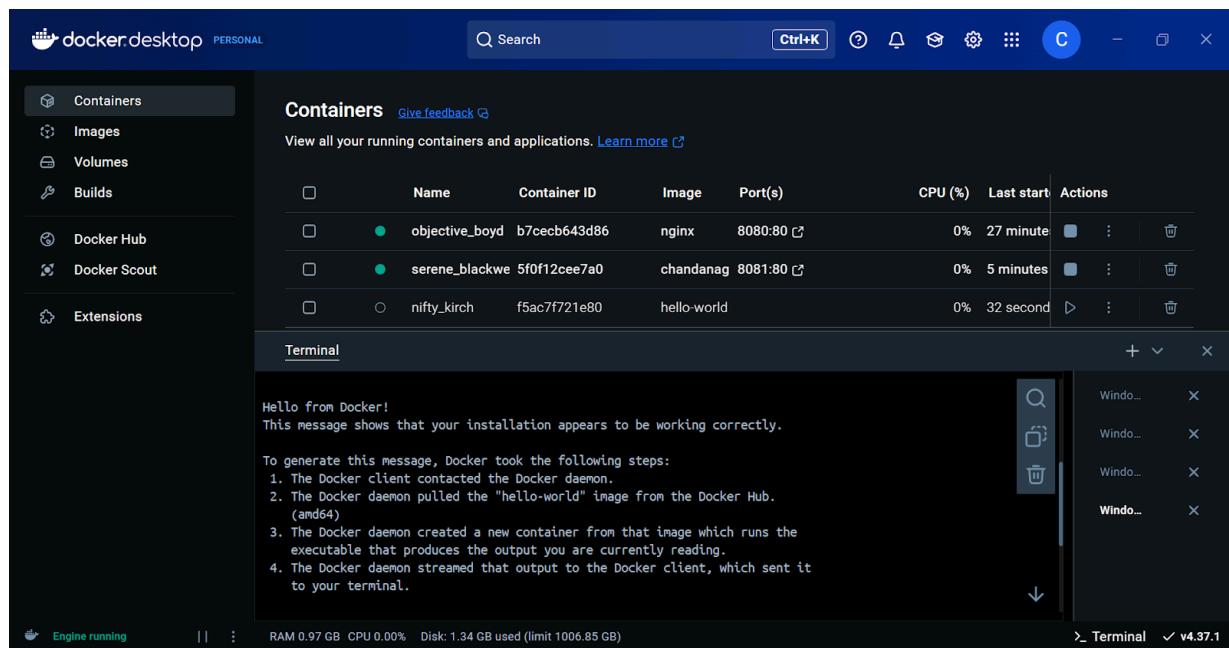
## Push NGINX Image to Docker Hub

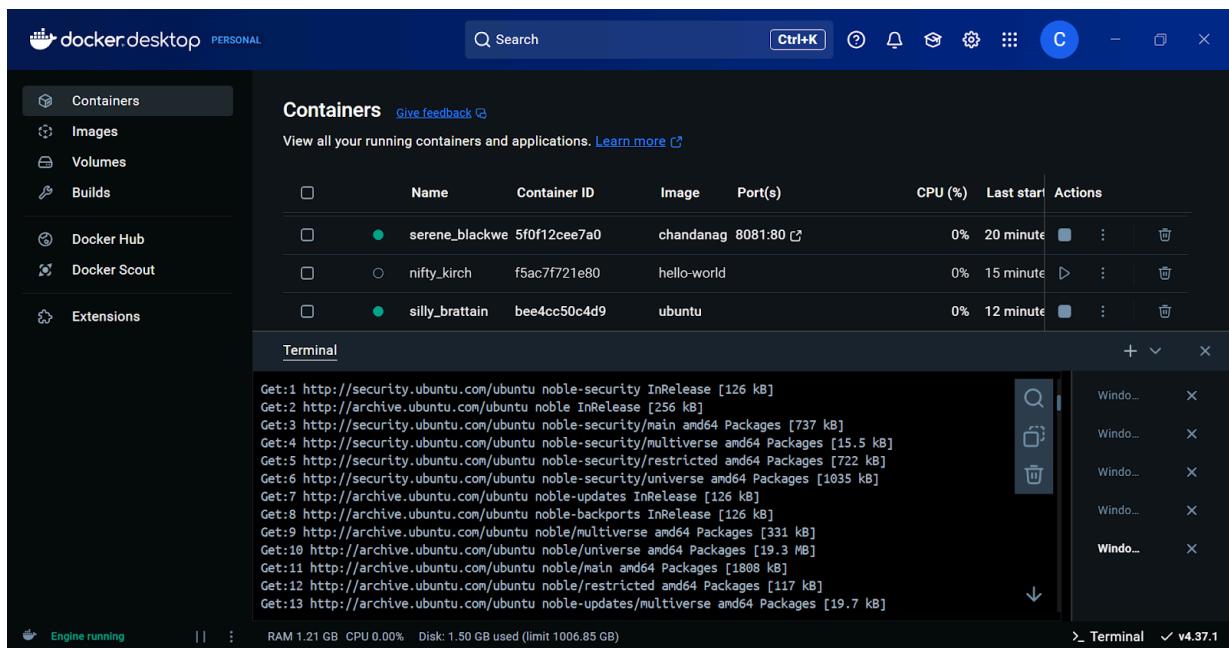
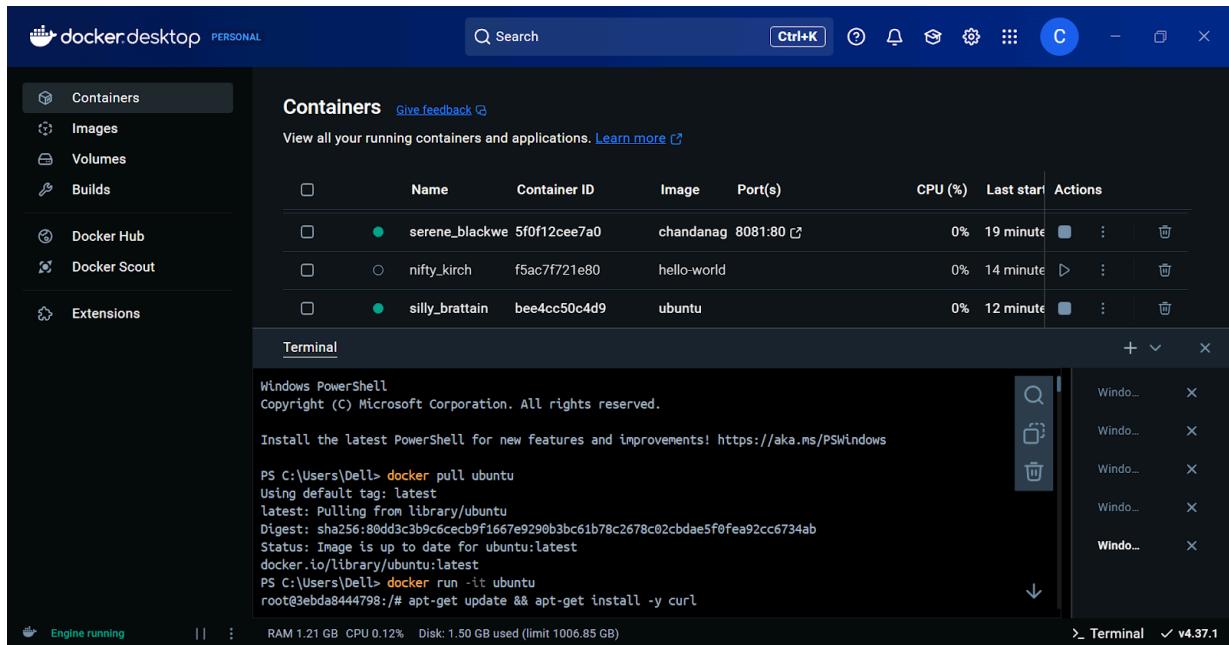
A screenshot of the Docker Desktop application. The sidebar shows "Containers" selected. The main area displays two containers: "objective\_boyd" (nginx image, port 8080:80) and "serene\_blackwe" (chandanag image, port 8081:80). The bottom section is a terminal window showing PowerShell output for pushing the "serene\_blackwe" image to Docker Hub. The terminal window also shows three other windows listed in the background.



## Repeat for Two Other Images







**Containers** Give feedback

View all your running containers and applications. [Learn more](#)

	Name	Container ID	Image	Port(s)	CPU (%)	Last start	Actions
serene_blackwe	5f0f12ccee7a0	chandanag	8081:80	0%	20 minutes	<input checked="" type="checkbox"/>	⋮ <span style="color: #0070C0;">⠄</span>
nifty_kirch	f5ac7f721e80	hello-world		0%	15 minutes	<input type="checkbox"/>	⋮ <span style="color: #0070C0;">⠄</span>
silly_brattain	bee4cc50c4d9	ubuntu		0%	13 minutes	<input type="checkbox"/>	⋮ <span style="color: #0070C0;">⠄</span>

**Terminal**

```
Get:14 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 Packages [984 kB]
Get:15 http://archive.ubuntu.com/ubuntu noble-updates/universe amd64 Packages [1266 kB]
Get:16 http://archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Packages [737 kB]
Get:17 http://archive.ubuntu.com/ubuntu noble-backports/universe amd64 Packages [11.9 kB]
Fetched 27.7 MB in 10s (2815 kB/s)
Reading package lists... Done
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  ca-certificates krb5-locales libbrotli libcurl4t64 libgssapi-krb5-2 libk5crypto3 libkeyutils1
  libkrb5-3 libkrb5support0 libldap-common libldap2 libnhttp2-14 libpsl5t64 librtmp1 libsasl2-2
  libsasl2-modules libsasl2-modules-db libssh-4 openssl publicsuffix

```

RAM 1.19 GB CPU 0.00% Disk: 1.50 GB used (limit 1006.85 GB) > Terminal ✓ v4.37.1

**Containers** Give feedback

View all your running containers and applications. [Learn more](#)

	Name	Container ID	Image	Port(s)	CPU (%)	Last start	Actions
serene_blackwe	5f0f12ccee7a0	chandanag	8081:80	0%	20 minutes	<input checked="" type="checkbox"/>	⋮ <span style="color: #0070C0;">⠄</span>
nifty_kirch	f5ac7f721e80	hello-world		0%	16 minutes	<input type="checkbox"/>	⋮ <span style="color: #0070C0;">⠄</span>
silly_brattain	bee4cc50c4d9	ubuntu		0%	13 minutes	<input type="checkbox"/>	⋮ <span style="color: #0070C0;">⠄</span>

**Terminal**

```
Suggested packages:
  krb5-doc krb5-user libsasl2-modules-gssapi-mit | libsasl2-modules-gssapi-heimdal libsasl2-modules-ldap
  libsasl2-modules-otp libsasl2-modules-sql
The following NEW packages will be installed:
  ca-certificates curl krb5-locales libbrotli libcurl4t64 libgssapi-krb5-2 libk5crypto3 libkeyutils1
  libkrb5-3 libkrb5support0 libldap-common libldap2 libnhttp2-14 libpsl5t64 librtmp1 libsasl2-2
  libsasl2-modules libsasl2-modules-db libssh-4 openssl publicsuffix
0 upgraded, 21 newly installed, 0 to remove and 0 not upgraded.
Need to get 3564 kB of archives.
After this operation, 9199 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 openssl amd64 3.0.13-0ubuntu3.4 [1003 kB]
Get:2 http://archive.ubuntu.com/ubuntu noble/main amd64 ca-certificates all 20240203 [159 kB]
Get:3 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 krb5-locales all 1.20.1-0ubuntu2.2 [14.0 kB]
```

RAM 1.19 GB CPU 0.12% Disk: 1.50 GB used (limit 1006.85 GB) > Terminal ✓ v4.37.1

Docker Desktop PERSONAL

**Containers** [Give feedback](#)

View all your running containers and applications. [Learn more](#)

	Name	Container ID	Image	Port(s)	CPU (%)	Last start	Actions
serene_blackwe	5f0f12ccee7a0	chandanag	8081:80	0%	20 minutes	<input type="checkbox"/>	⋮ <span style="color: green;">⠄</span>
nifty_kirch	f5ac7f721e80	hello-world		0%	16 minutes	<input type="checkbox"/>	⋮ <span style="color: orange;">⠄</span>
silly_brattain	bee4cc50c4d9	ubuntu		0%	13 minutes	<input type="checkbox"/>	⋮ <span style="color: green;">⠄</span>

**Terminal**

```
B]
Get:4 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 libkrb5support0 amd64 1.20.1-6ubuntu2.2 [33.7 kB]
Get:5 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 libk5crypto3 amd64 1.20.1-6ubuntu2.2 [81.8 kB]
Get:6 http://archive.ubuntu.com/ubuntu noble/main amd64 libkeyutils1 amd64 1.6.3-3build1 [9490 B]
Get:7 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 libkrb5-3 amd64 1.20.1-6ubuntu2.2 [347 kB]
Get:8 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 libgssapi-krb5-2 amd64 1.20.1-6ubuntu2.2 [143 kB]
Get:9 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 libnghhttp2-14 amd64 1.59.0-1ubuntu0.1 [74.3 kB]
Get:10 http://archive.ubuntu.com/ubuntu noble/main amd64 libpsl5t64 amd64 0.21.2-1.1build1 [57.1 kB]
Get:11 http://archive.ubuntu.com/ubuntu noble/main amd64 publicsuffix all 20231001.0357-0.1 [129 kB]
```

RAM 1.18 GB CPU 0.00% Disk: 1.50 GB used (limit 1006.85 GB) > Terminal ✓ v4.37.1

Docker Desktop PERSONAL

**Containers** [Give feedback](#)

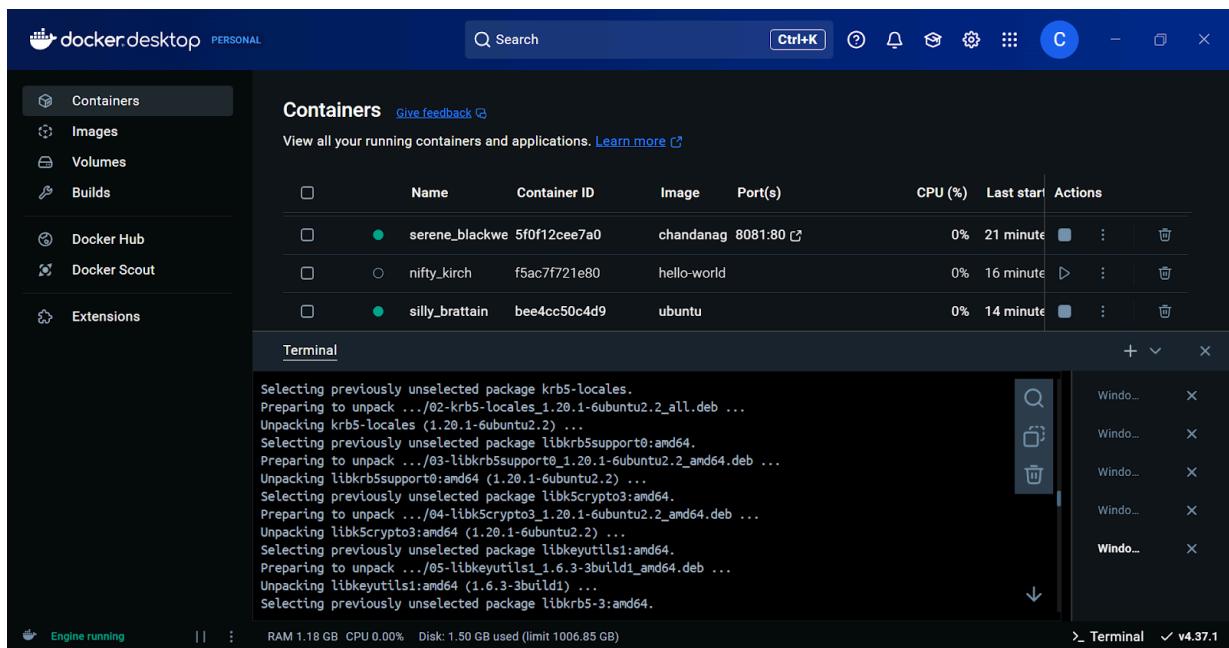
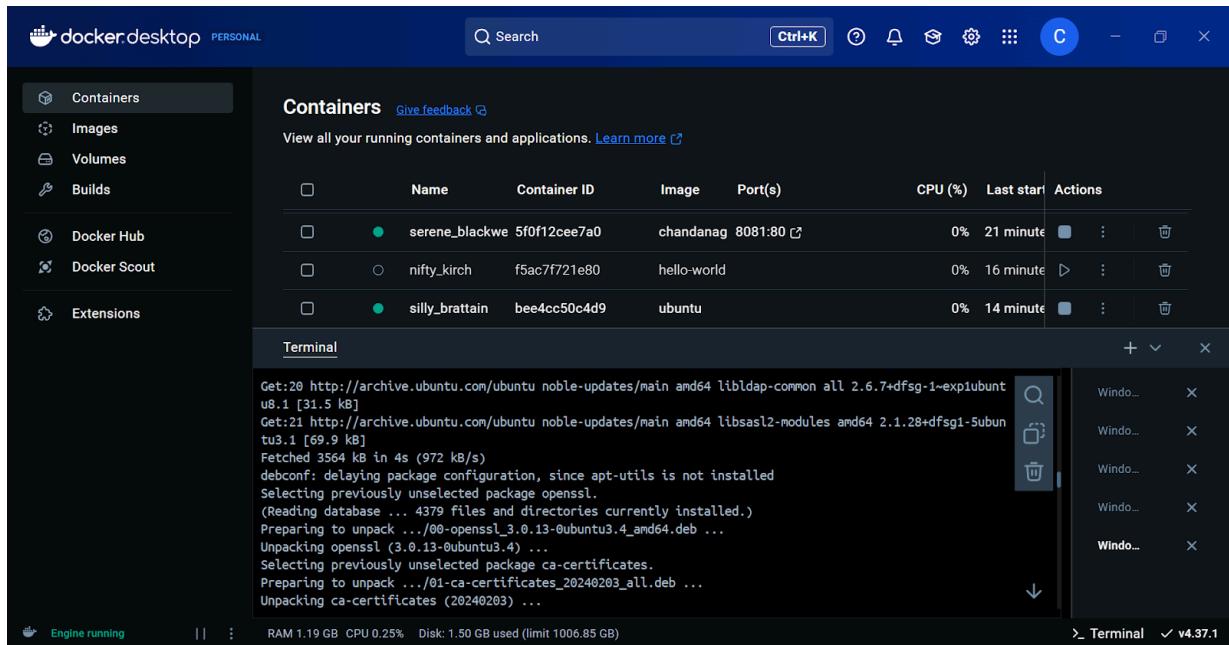
View all your running containers and applications. [Learn more](#)

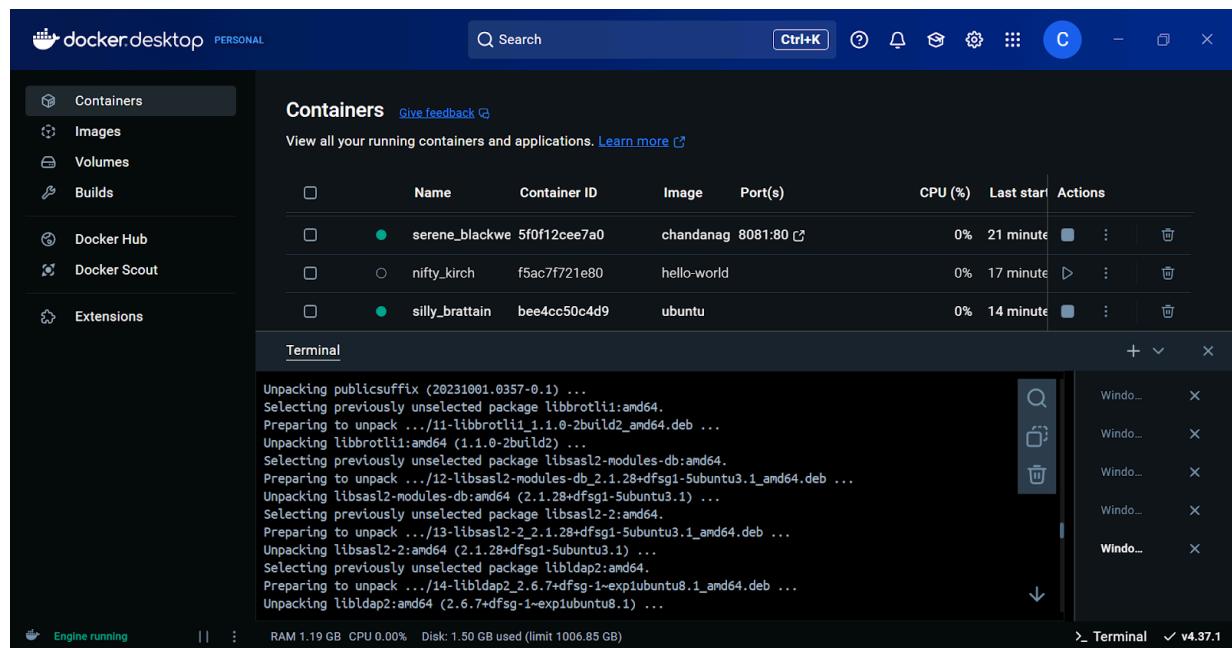
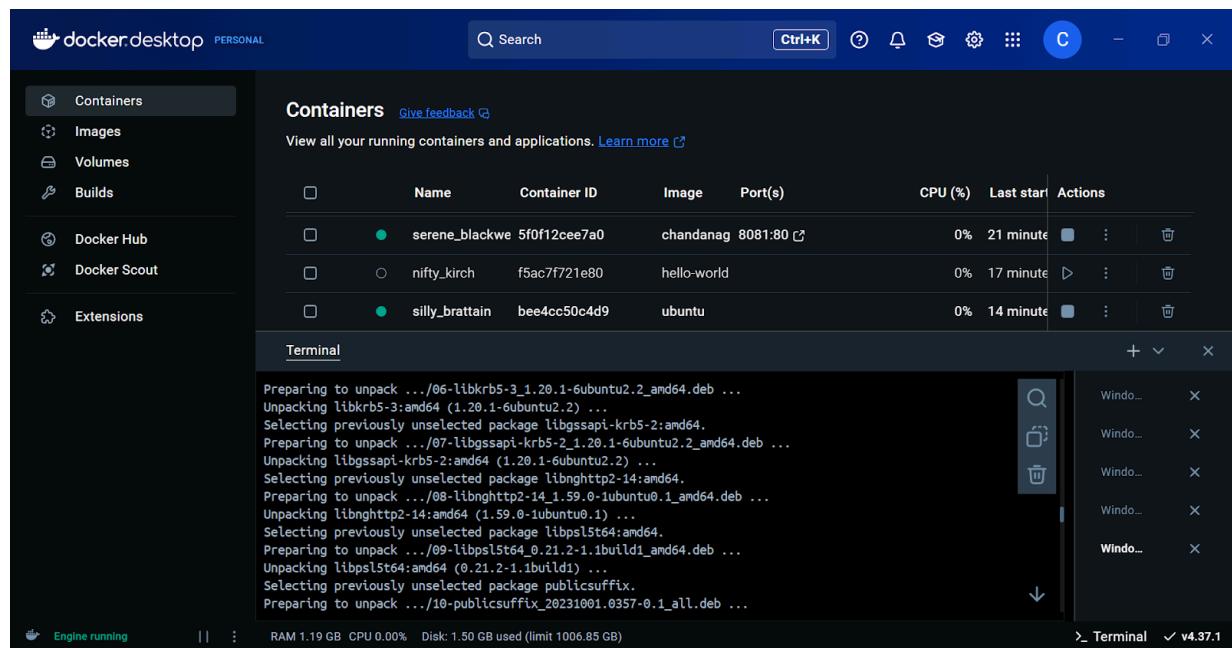
	Name	Container ID	Image	Port(s)	CPU (%)	Last start	Actions
serene_blackwe	5f0f12ccee7a0	chandanag	8081:80	0%	20 minutes	<input type="checkbox"/>	⋮ <span style="color: green;">⠄</span>
nifty_kirch	f5ac7f721e80	hello-world		0%	16 minutes	<input type="checkbox"/>	⋮ <span style="color: orange;">⠄</span>
silly_brattain	bee4cc50c4d9	ubuntu		0%	13 minutes	<input type="checkbox"/>	⋮ <span style="color: green;">⠄</span>

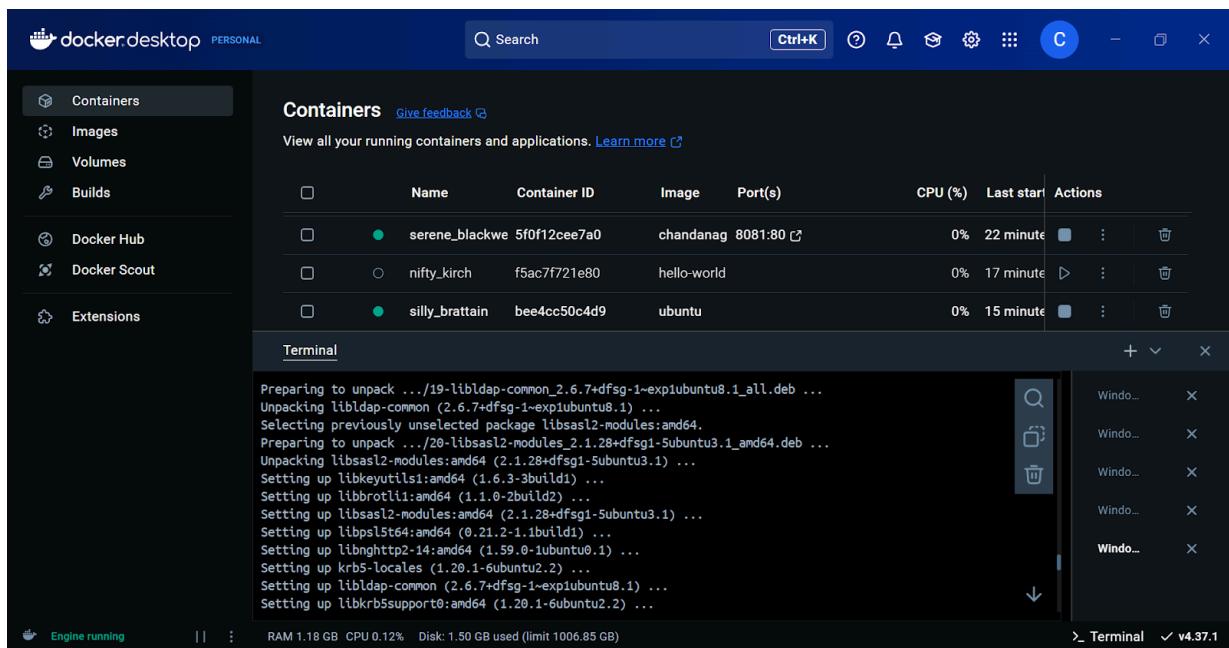
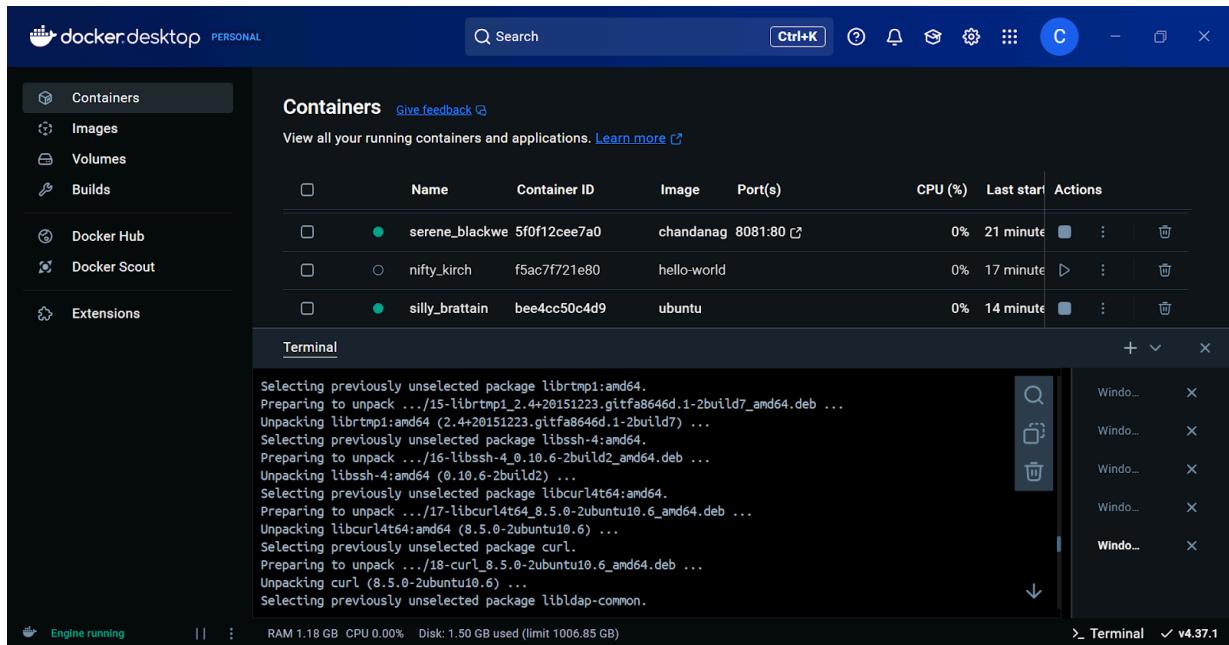
**Terminal**

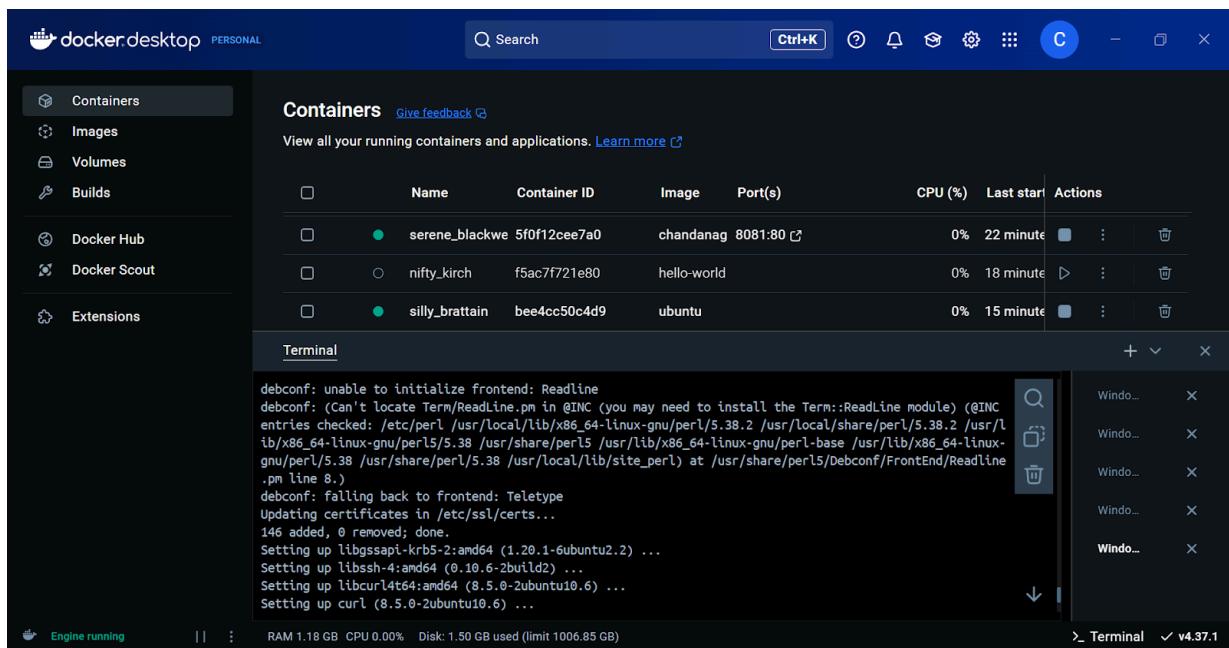
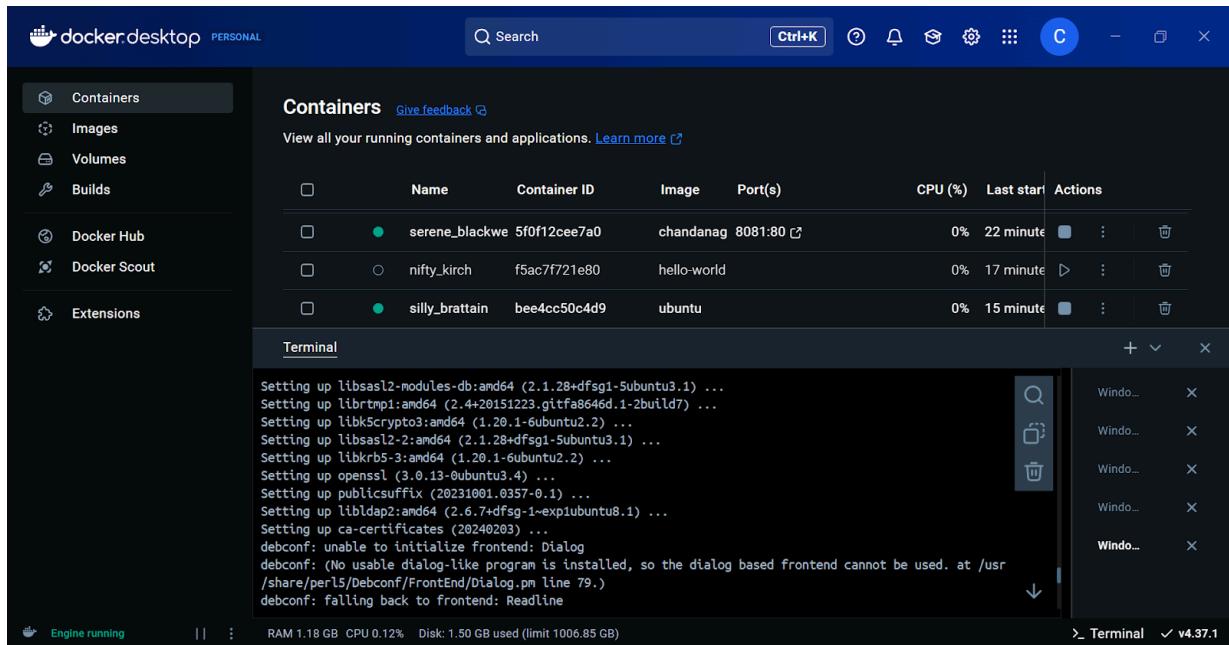
```
Get:12 http://archive.ubuntu.com/ubuntu noble/main amd64 libbrotli1 amd64 1.1.0-2build2 [331 kB]
Get:13 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 libssl2-modules-db amd64 2.1.28+dfsg1-5ubuntu3.1 [20.4 kB]
Get:14 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 libssl2-2 amd64 2.1.28+dfsg1-Subuntu3.1 [53.2 kB]
Get:15 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 libldap2 amd64 2.6.7+dfsg-1-expiubuntu8.1 [195 kB]
Get:16 http://archive.ubuntu.com/ubuntu noble/main amd64 librtmpi amd64 2.4+2015i223.gitfa8646d.1-2build7 [56.3 kB]
Get:17 http://archive.ubuntu.com/ubuntu noble/main amd64 libssh-4 amd64 0.10.6-2build2 [188 kB]
Get:18 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 libcurl4t64 amd64 8.5.0-2ubuntu10.6 [341 kB]
Get:19 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 curl amd64 8.5.0-2ubuntu10.6 [226 kB]
```

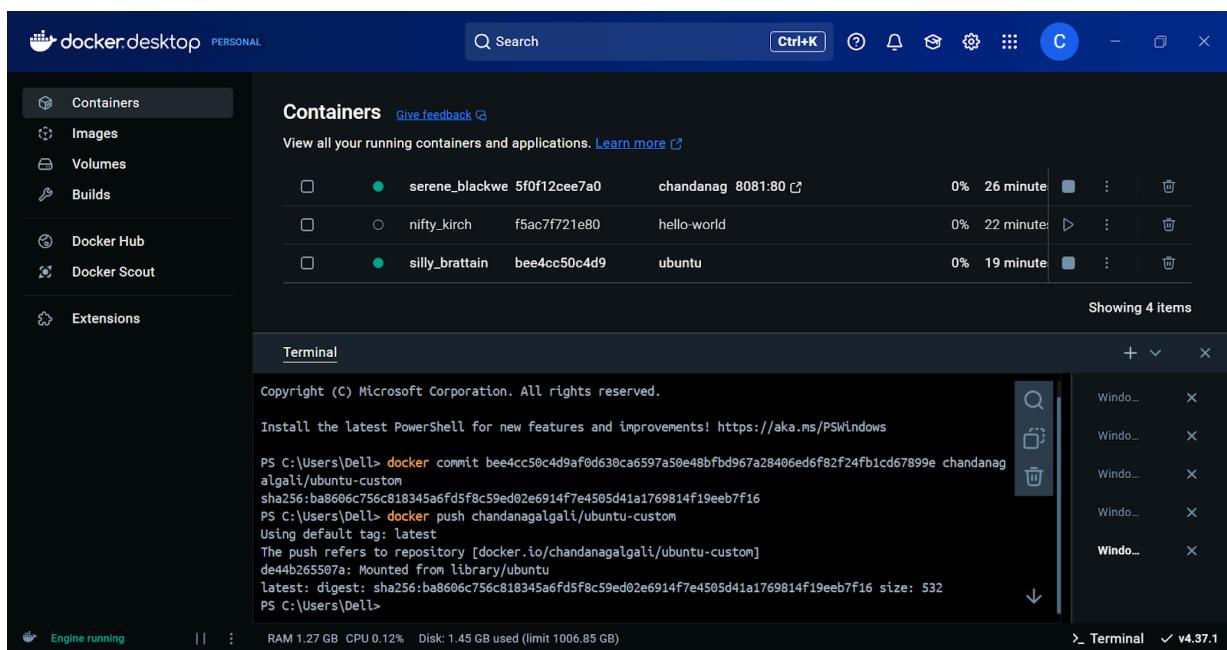
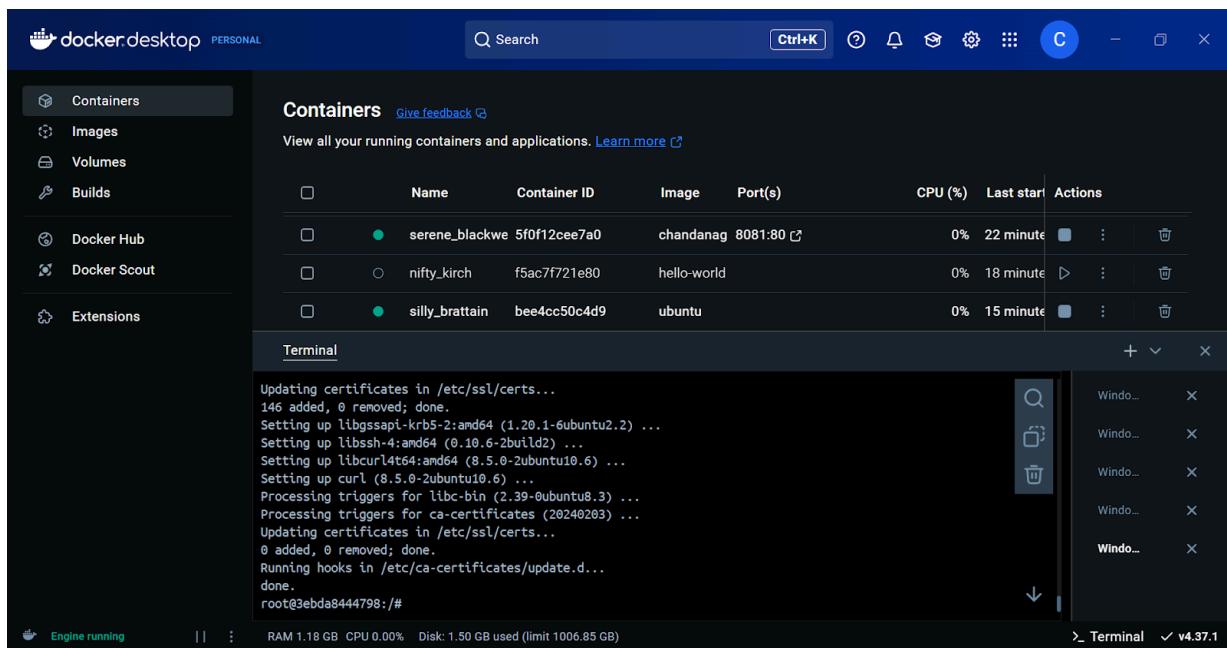
RAM 1.18 GB CPU 0.00% Disk: 1.50 GB used (limit 1006.85 GB) > Terminal ✓ v4.37.1











## Verify Docker Hub Repository

Docker Desktop PERSONAL

**Images** Give feedback

View and manage your local and Docker Hub images. [Learn more](#)

**Local** **Hub repositories**

293.79 MB / 294.11 MB in use 6 images

Last refresh: 2 minutes ago ↻

	Name	Tag	Image ID	Created	Size	Actions
<input type="checkbox"/>	nginx	latest	0a399eb16751	2 months ago	278.25 MB	<input type="button" value="▶"/> <input type="button" value="⋮"/> <input type="button" value="trash"/>
<input type="checkbox"/>	chandanagalgal/nginx-custom	latest	081404ffad24	36 minutes ago	278.27 MB	<input type="button" value="▶"/> <input type="button" value="⋮"/> <input type="button" value="trash"/>
<input type="checkbox"/>	hello-world	latest	1b7a37f2a0e2	2 years ago	24.38 KB	<input type="button" value="▶"/> <input type="button" value="⋮"/> <input type="button" value="trash"/>
<input type="checkbox"/>	ubuntu	latest	80dd3c3b9c6c	2 months ago	117.32 MB	<input type="button" value="▶"/> <input type="button" value="⋮"/> <input type="button" value="trash"/>
<input type="checkbox"/>	<none>	<none>	b0e471ac13a1	8 minutes ago	117.32 MB	<input type="button" value="▶"/> <input type="button" value="⋮"/> <input type="button" value="trash"/>
<input type="checkbox"/>	chandanagalgal/ubuntu-custor	latest	ba8606c756c8	7 minutes ago	117.32 MB	<input type="button" value="▶"/> <input type="button" value="⋮"/> <input type="button" value="trash"/>

Showing 6 items

Engine running | RAM 1.06 GB CPU 0.12% Disk: 1.45 GB used (limit 1006.85 GB) | Terminal ✓ v4.37.1

## 10 Docker Commands

Docker Desktop PERSONAL

**Containers** Give feedback

View all your running containers and applications. [Learn more](#)

Container CPU usage i 0.00% / 800% (8 CPUs available)

Container memory usage i 884KB / 2.78GB

Show charts

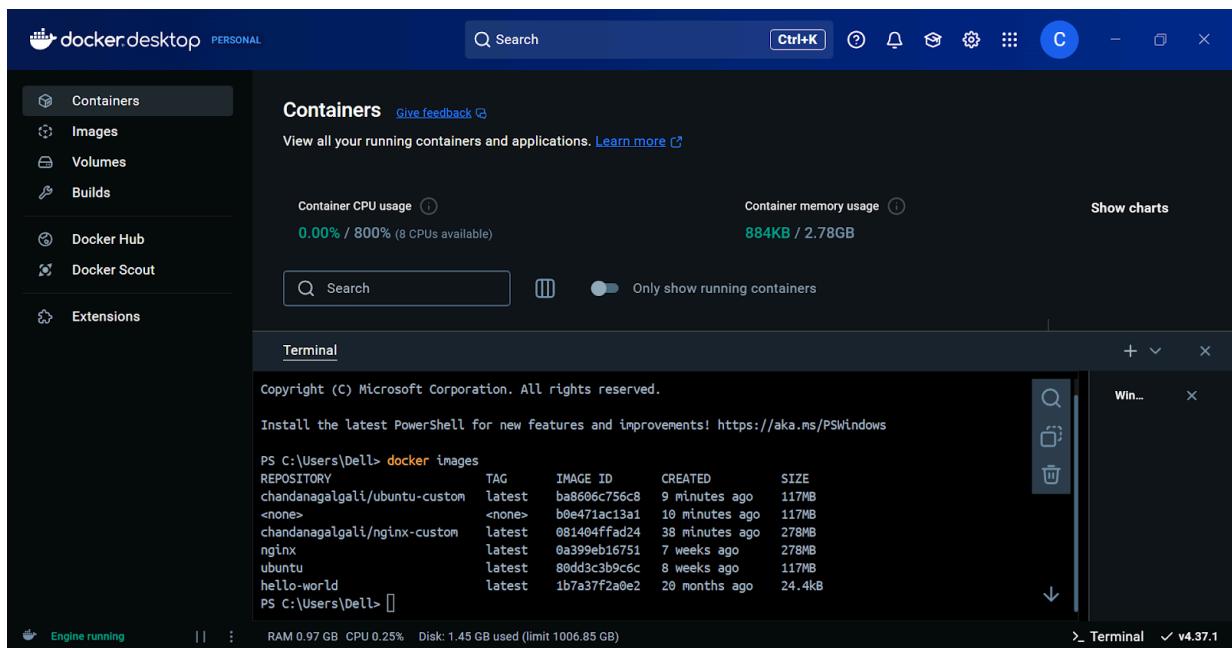
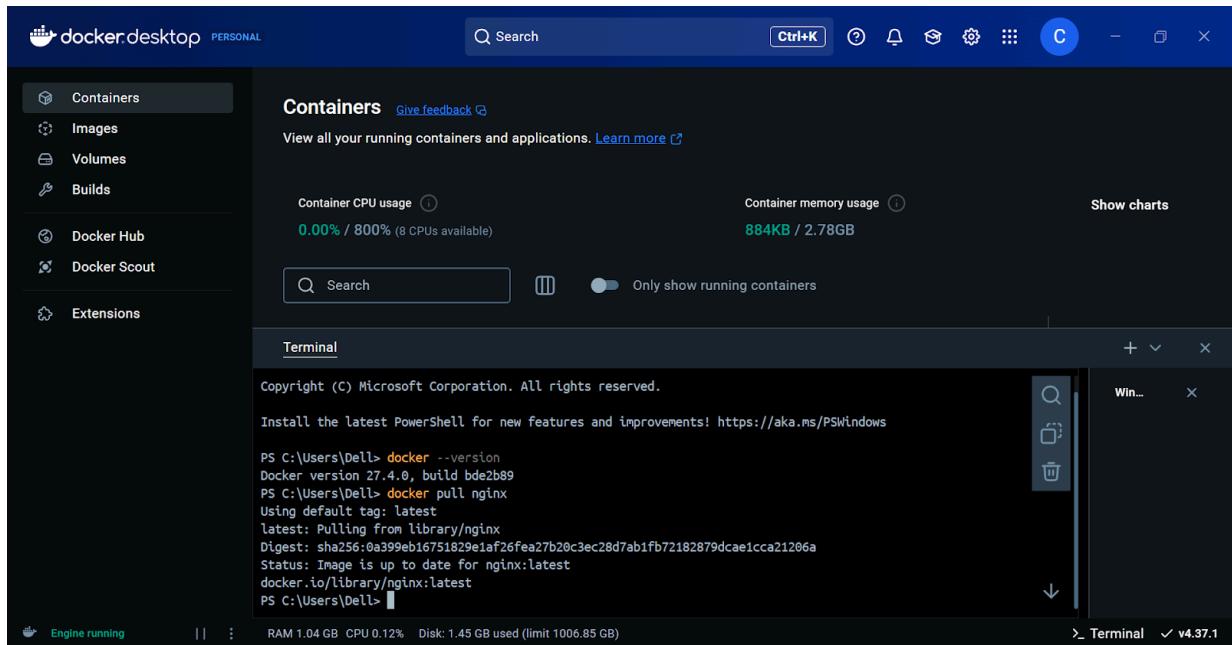
**Terminal**

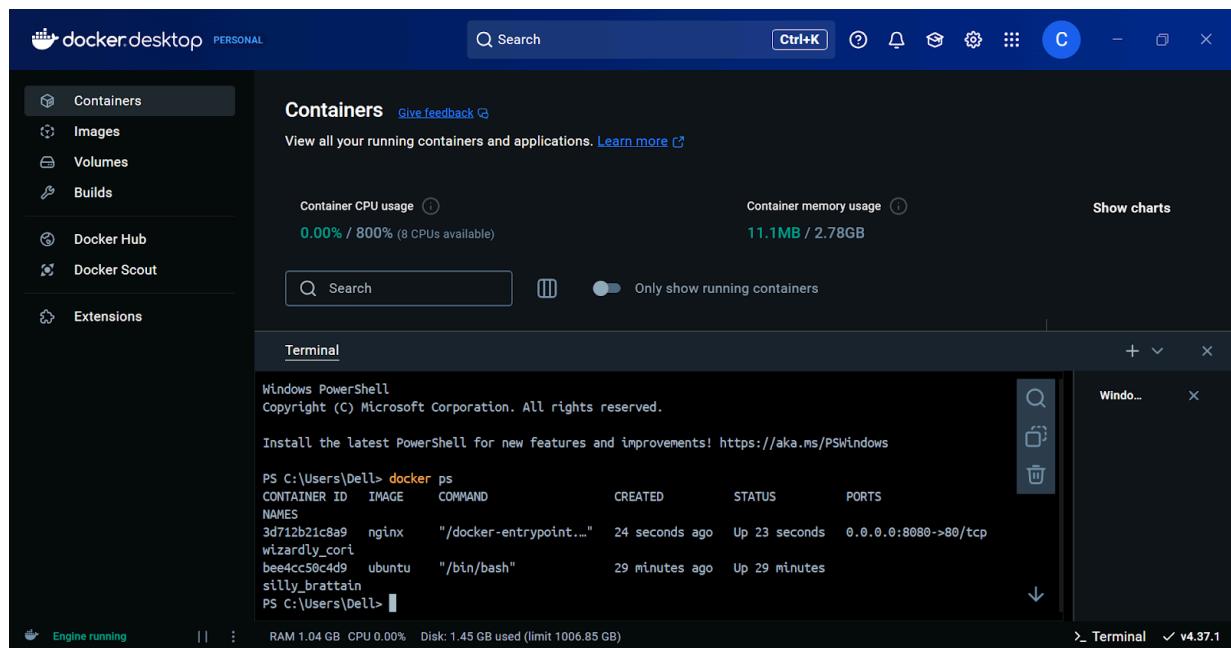
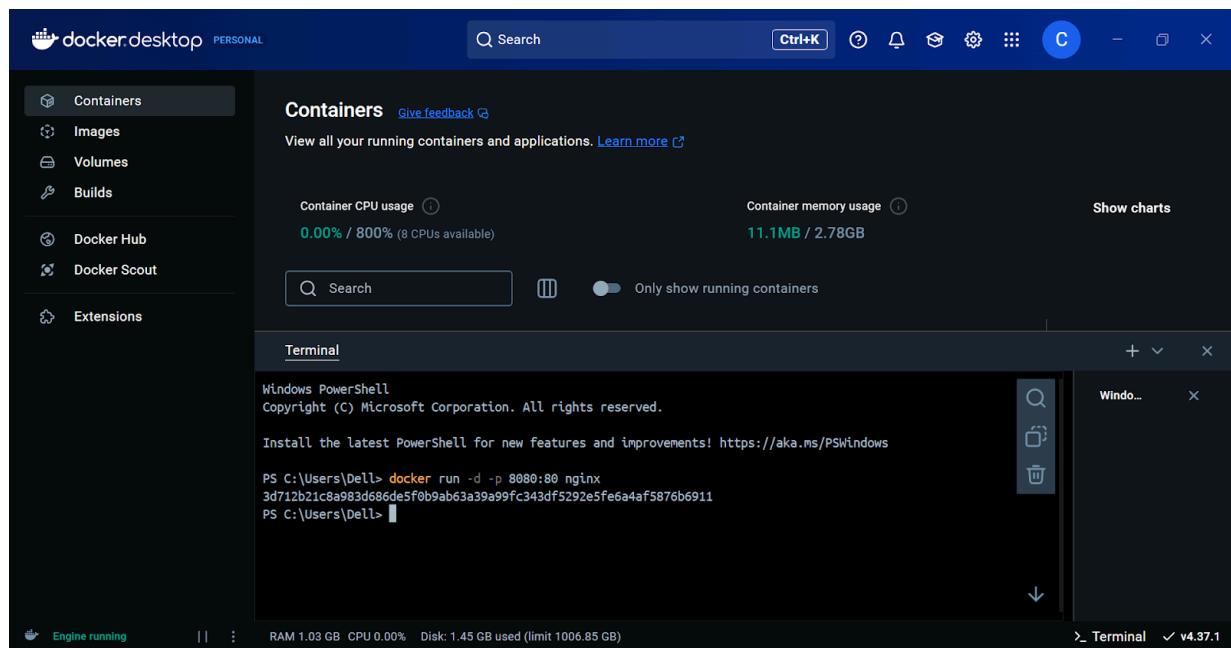
```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

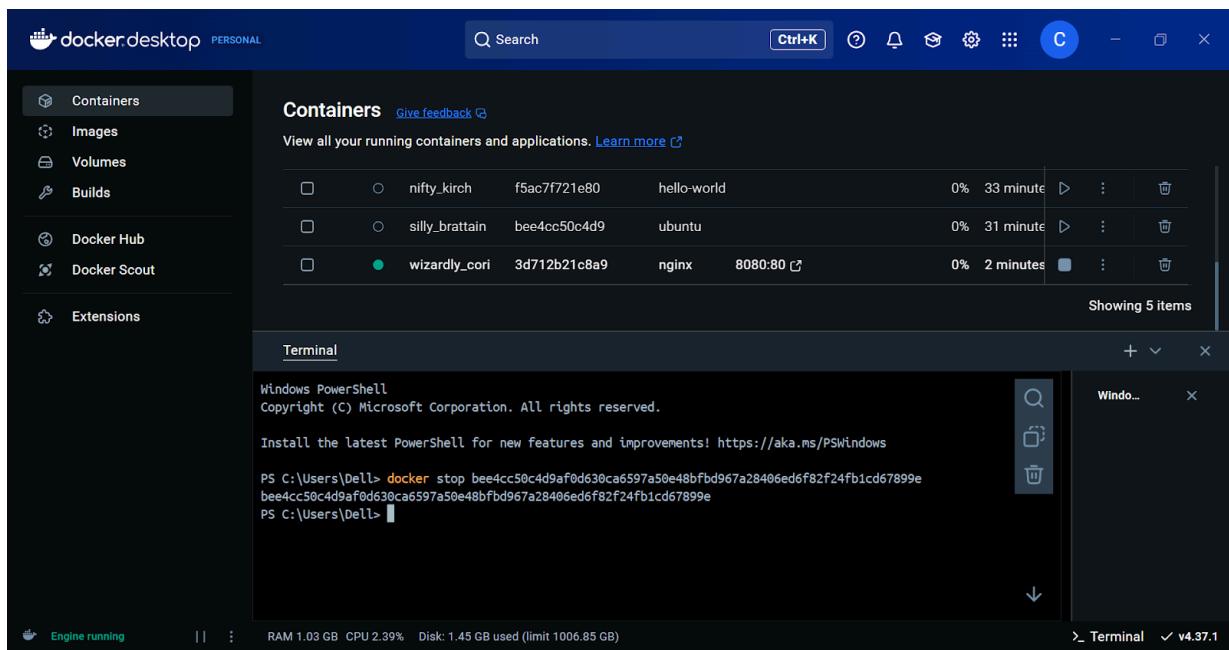
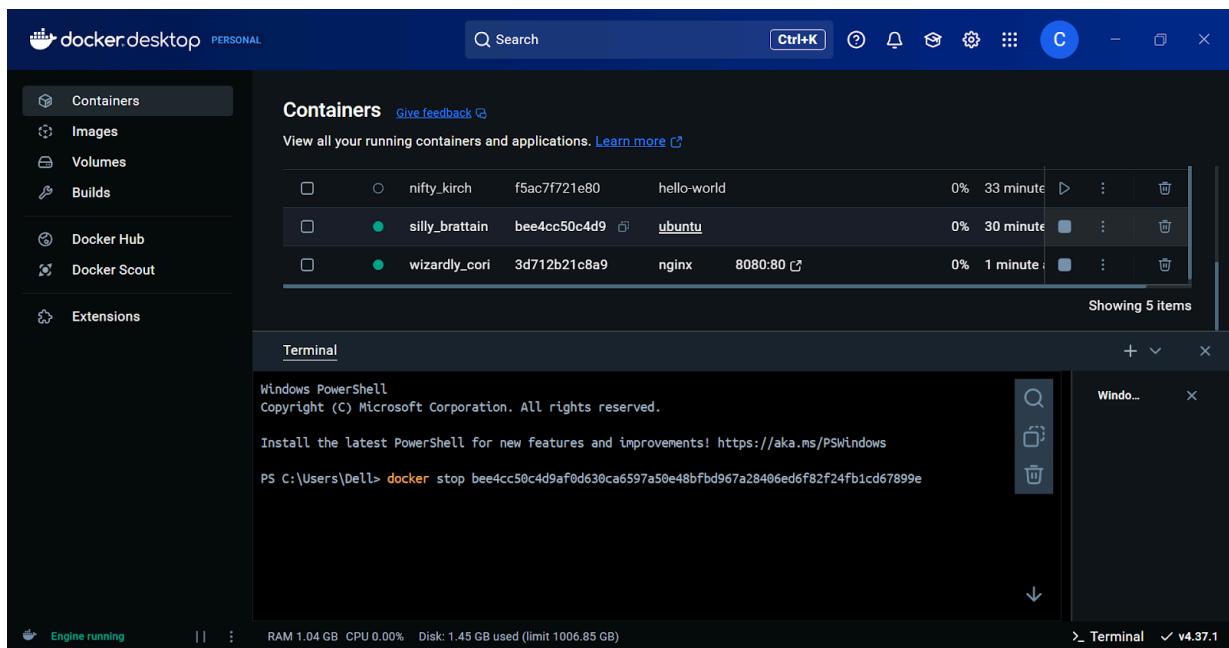
Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

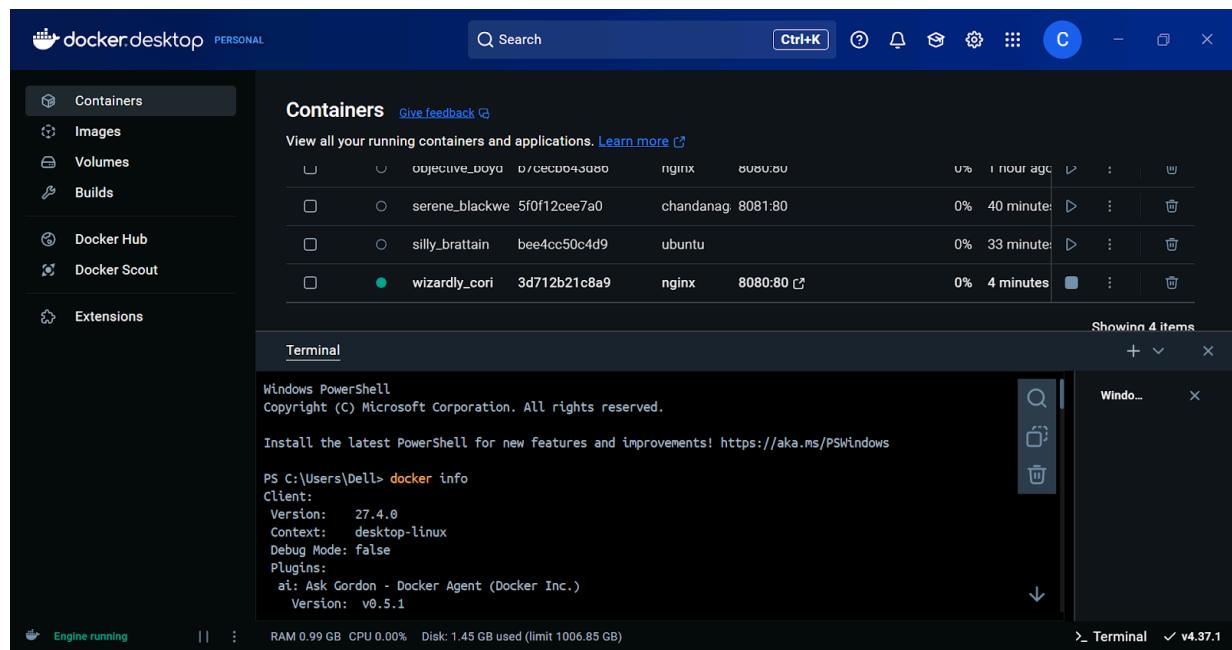
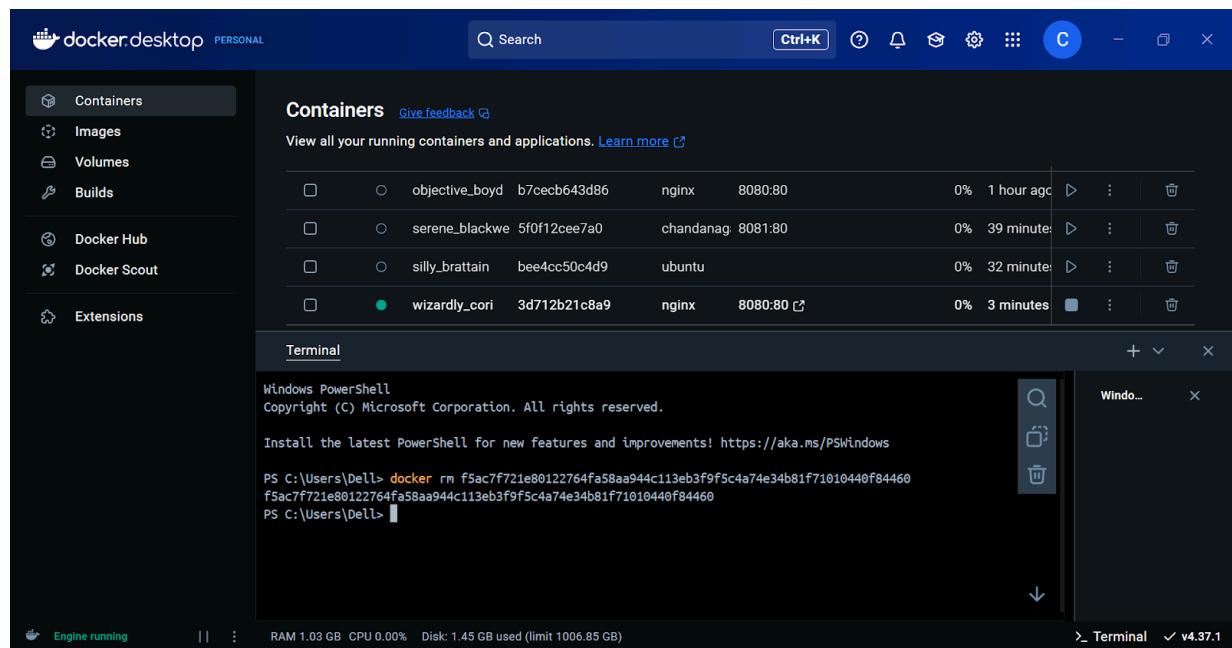
PS C:\Users\Del1> docker --version
Docker version 27.4.0, build bde2b89
PS C:\Users\Del1>
```

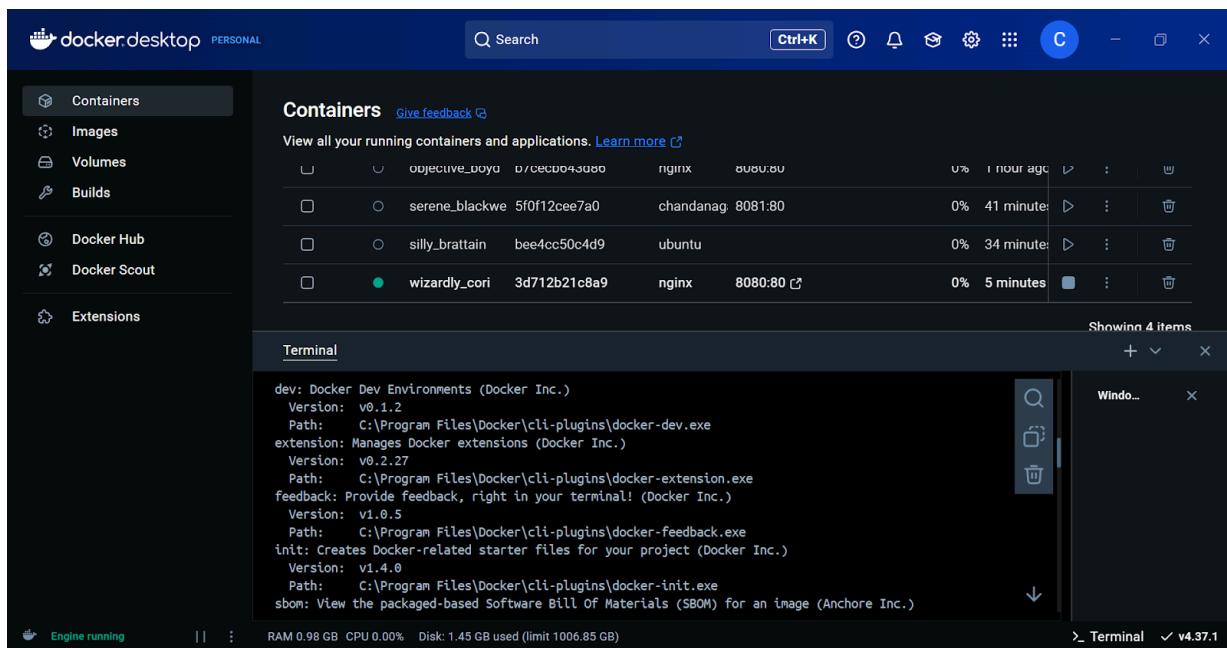
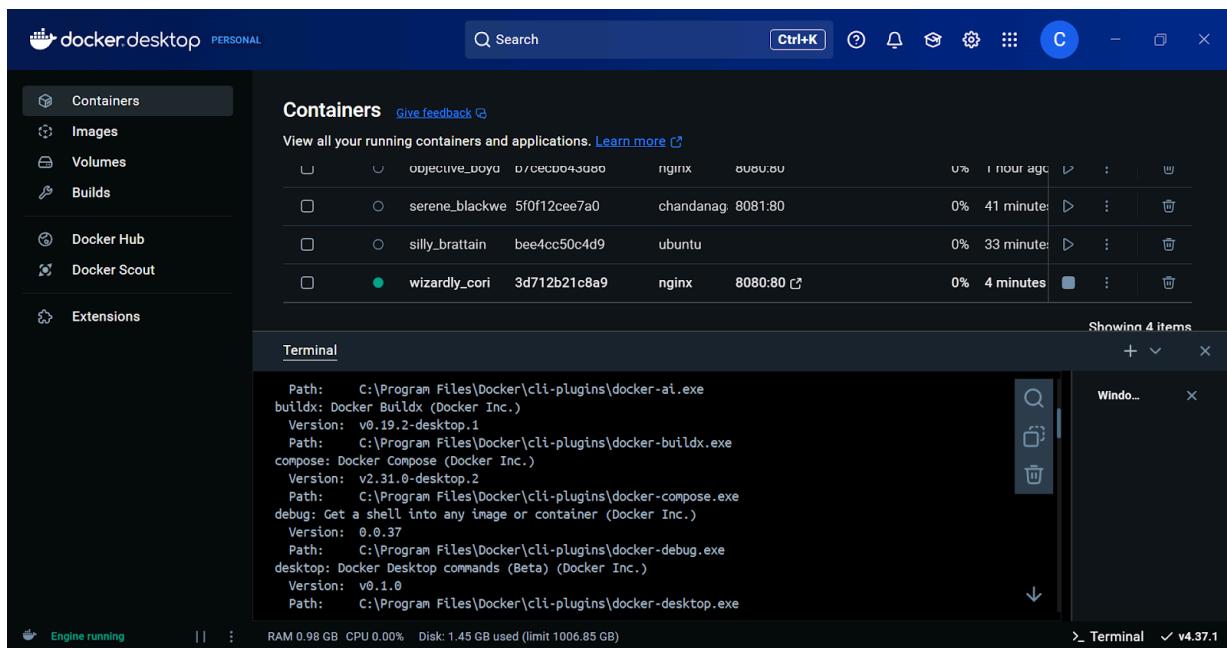
Engine running | RAM 1.03 GB CPU 0.00% Disk: 1.45 GB used (limit 1006.85 GB) | Terminal ✓ v4.37.1

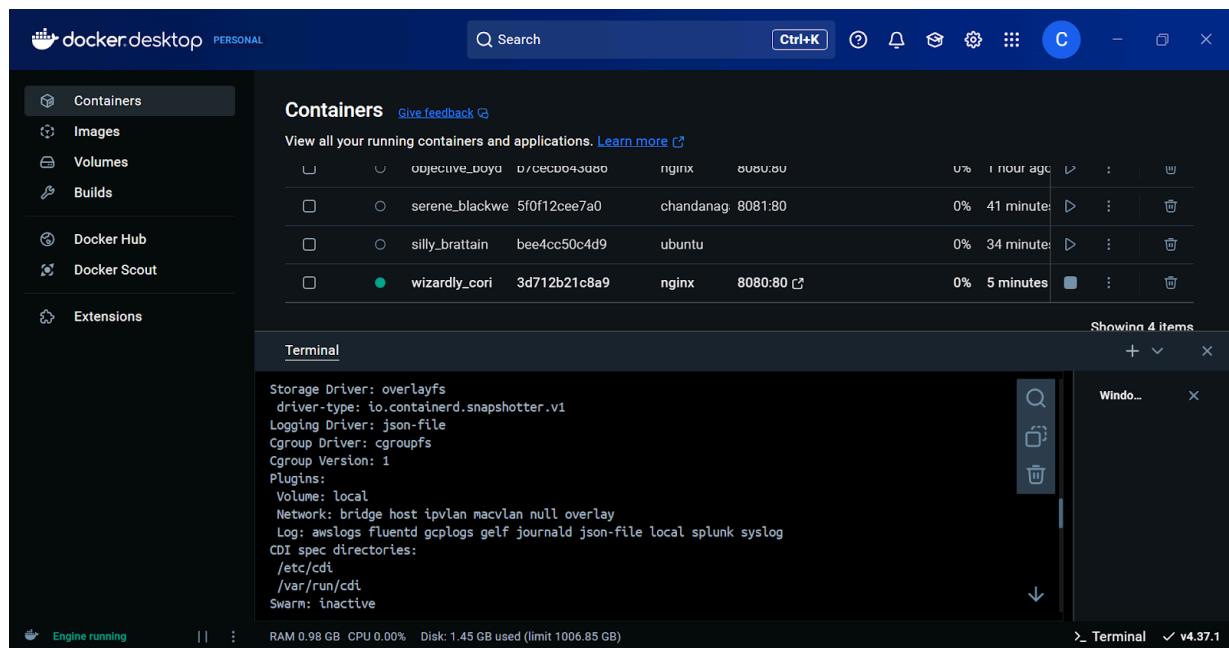
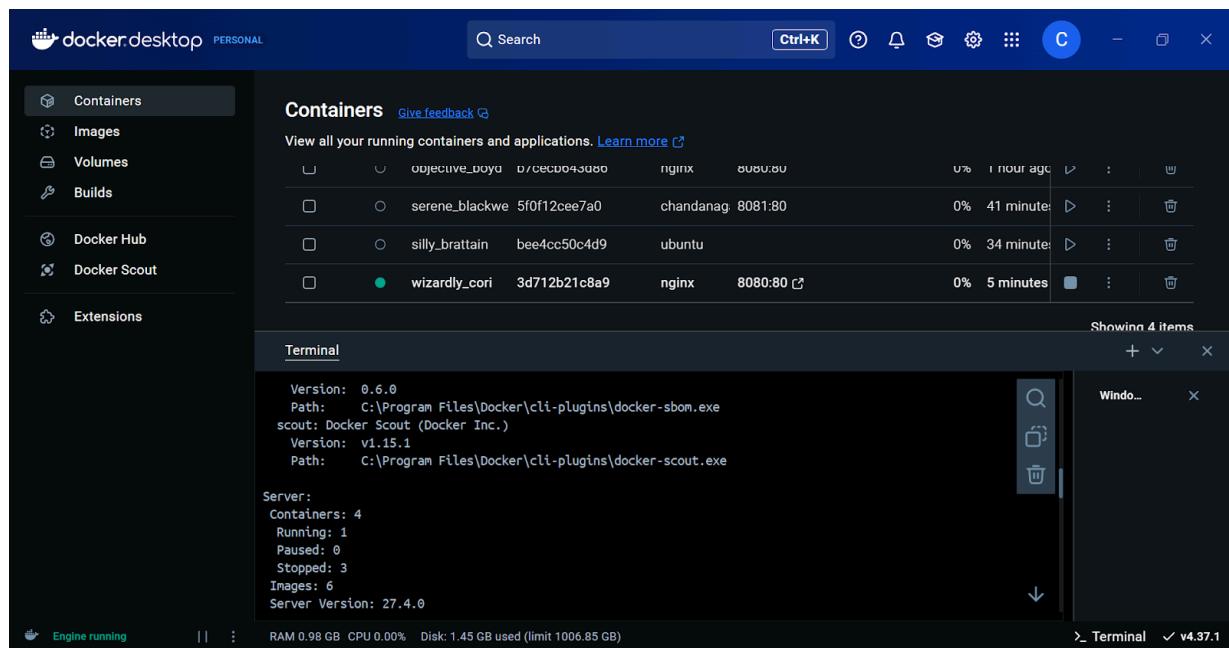


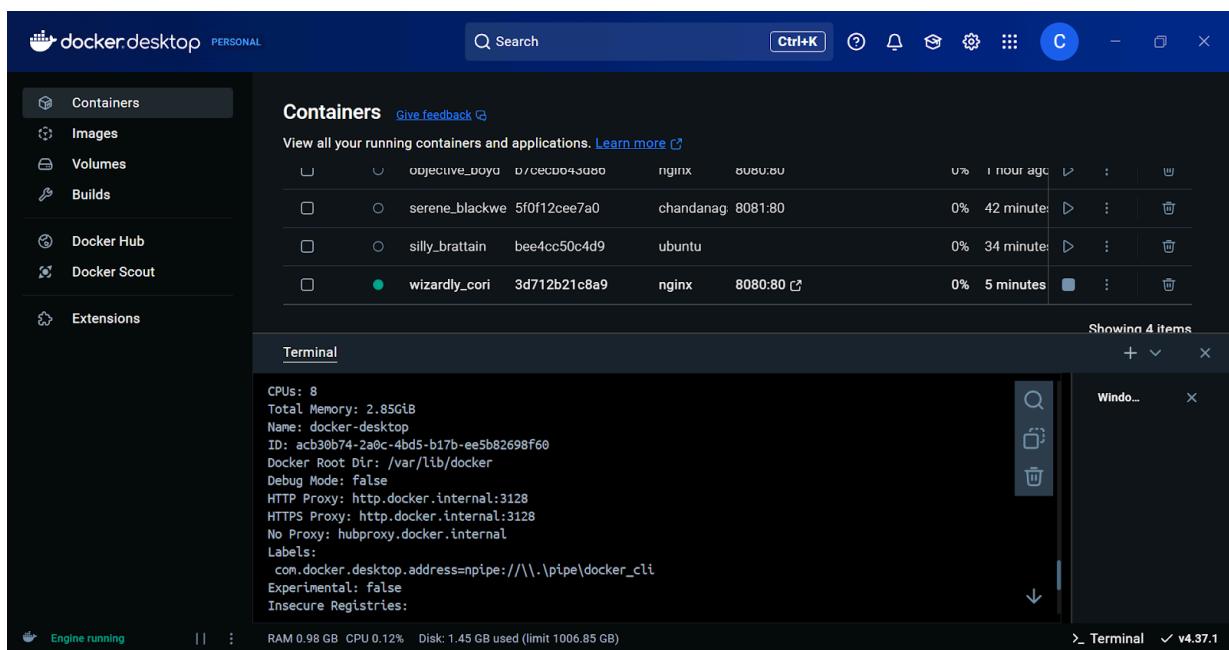
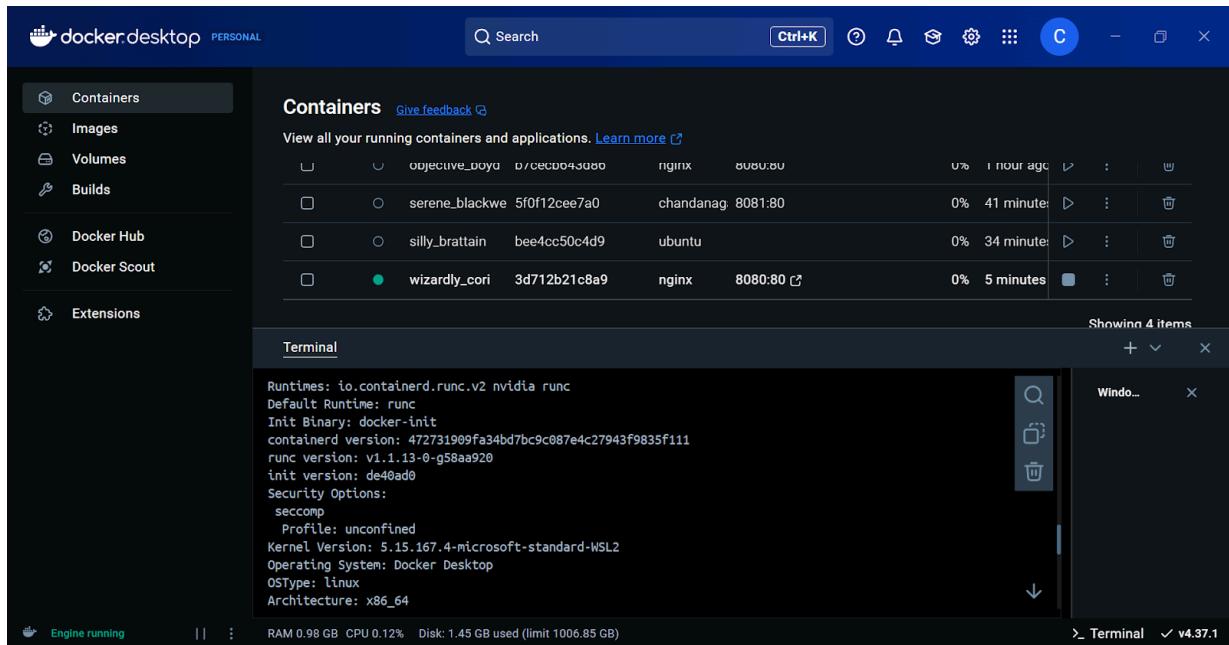


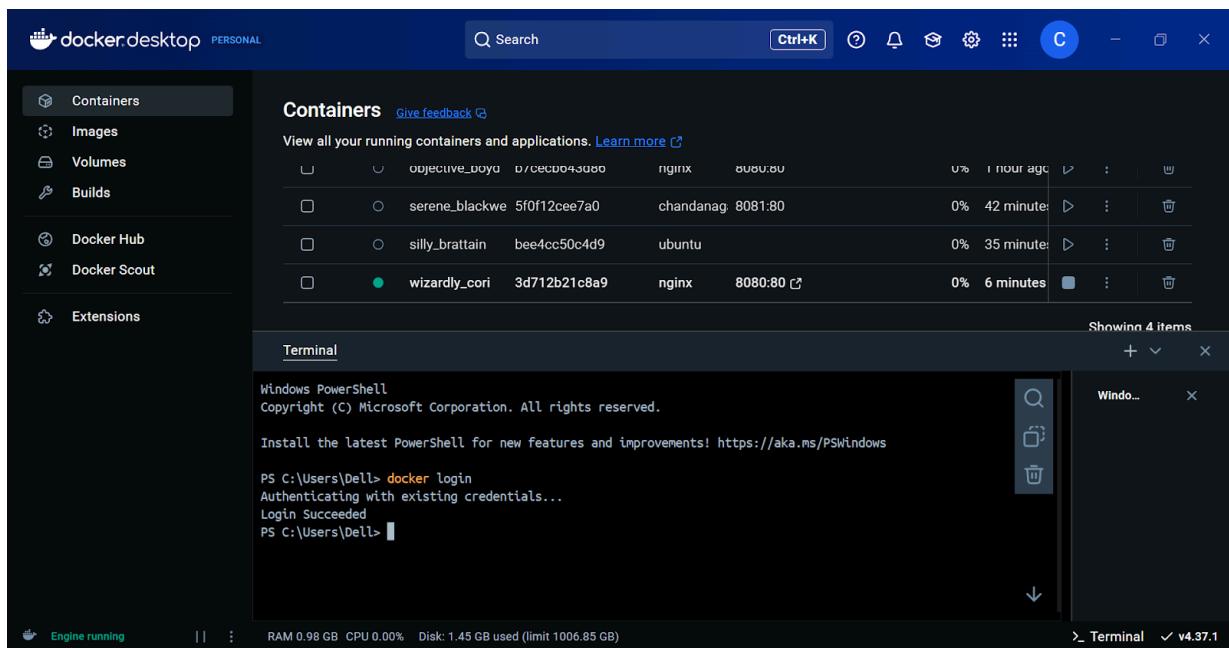
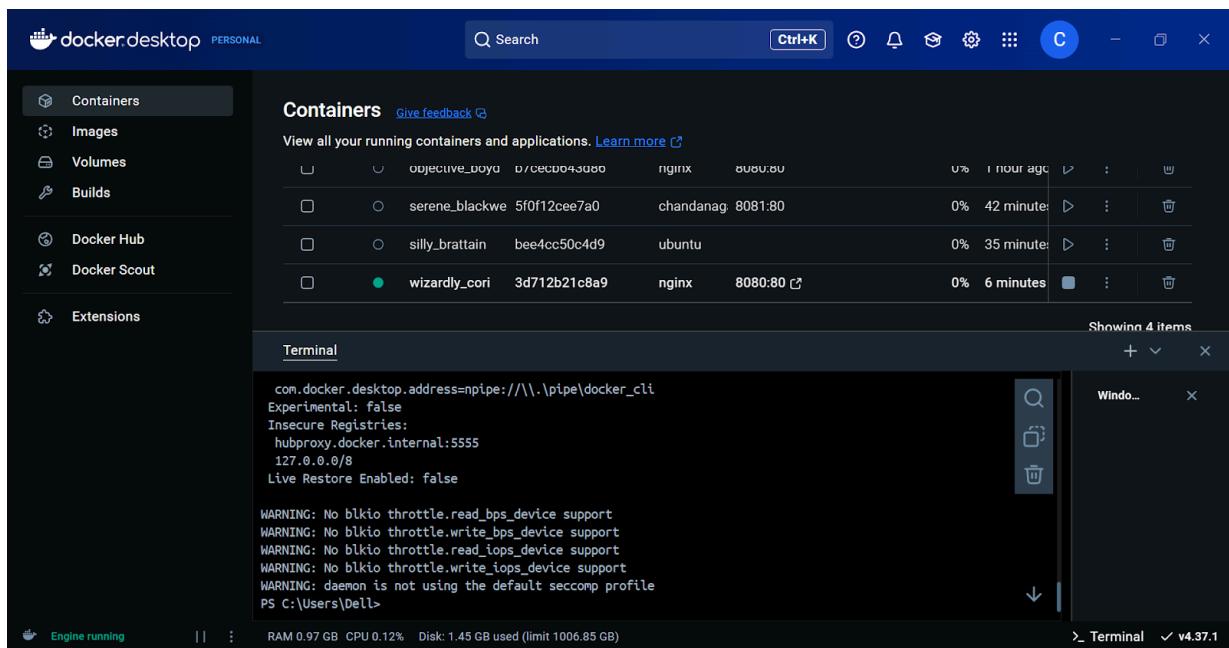












## Questions:

### What is a Docker file?

**Ans:** A Dockerfile is a text document that contains a set of instructions to automate the creation of a Docker image. It specifies the base image, software packages, configurations, and commands to set up an environment. The Dockerfile is used by the Docker engine to build images automatically by reading the instructions line-by-line.

**Outcomes:**

**CO1 – Understand Virtualization**

**CO3 – Analyze different cloud architectures and IoT-cloud**

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**Conclusion: (Conclusion to be based on the Results and outcomes achieved)**

The experiment demonstrated the process of installing Docker, pulling and running images from Docker Hub, modifying containers, and pushing the modified images back to Docker Hub. The procedure helped understand the creation, management, and use of Docker images and containers, including hosting a web server (Nginx) and deploying applications. The practical exposure reinforced the concept of containerization and how it simplifies application deployment and portability.

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**Grade: AA / AB / BB / BC / CC / CD / DD**

**Signature of faculty in-charge with date**

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**References:**

**Books/ Journals/ Websites:**

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<https://www.youtube.com/watch?v=rwLfGe0U-zY>
  8. <https://www.docker.com/blog/how-to-use-the-official-nginx-docker-image/>
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