**Step 1: Install NVIDIA Container Toolkit**

Run the following command in PowerShell or Command Prompt:

wsl --update

wsl --install -d Ubuntu

Install NVIDIA Container Toolkit:

curl -s -L https://nvidia.github.io/nvidia-docker/gpgkey | sudo apt-key add -

distribution=$(. /etc/os-release;echo $ID$VERSION_ID)

curl -s -L https://nvidia.github.io/nvidia-docker/$distribution/nvidia-docker.list | sudo tee /etc/apt/sources.list.d/nvidia-docker.list

sudo apt update && sudo apt install -y nvidia-docker2

sudo systemctl restart docker

Verify installation:

nvidia-container-cli --version

**Step 2: Create the Dockerfile**

Create a Dockerfile in a new project directory and add the following content:

FROM nvidia/cuda:12.2.2-runtime-ubuntu22.04

RUN apt update && apt install -y python3 python3-pip

CMD ["nvidia-smi"]

**Step 3: Build the Docker Image**

Run the following command to build the Docker image:

docker build -t my-nvidia-container .

PS C:\Users\acer\Desktop\Tabish\4_WAD\Assignment_2B> docker build -t my-nvidia-container .

[+] Building 3.9s (12/12) FINISHED docker:desktop-linux
 => [internal] load build definition from Dockerfile 0.1s
 => => transferring dockerfile: 599B 0.0s
 => [internal] load metadata for docker.io/nvidia/cuda:12.2.0-devel-ubuntu22.04 3.6s
 => [auth] nvidia/cuda:pull token for registry-1.docker.io 0.0s
 => [internal] load .dockerignore 0.0s

```
 => => transferring context: 2B                                                0.0s
 => [1/6] FROM docker.io/nvidia/cuda:12.2.0-devel-
ubuntu22.04@sha256:c4e81887e4aa9f13b1119337323cba89601319ecb282  0.0s
 => [internal] load build context                                              0.0s
 => => transferring context: 93B                                               0.0s
 => CACHED [2/6] WORKDIR /app                                                  0.0s
 => CACHED [3/6] RUN apt update && apt install -y python3 python3-pip && rm -rf
/var/lib/apt/lists/*              0.0s
 => CACHED [4/6] COPY requirements.txt .
0.0s
 => CACHED [5/6] RUN pip3 install --no-cache-dir -r requirements.txt
0.0s
 => CACHED [6/6] COPY . .                                                      0.0s
 => exporting to image                                                         0.0s
 => => exporting layers                                                        0.0s
 => => writing image
sha256:a3347347b35ecf0171e574d8796fe3407a0c6f707259ad18e94ee4d4b0f48b9f
0.0s
 => => naming to docker.io/library/my-nvidia-container
0.0s
```

**Step 4: Run the Docker Container with GPU Access**

Execute the following command to start the container:

```
docker run --rm --gpus all my-nvidia-container
```

```
PS C:\Users\acer\Desktop\Tabish\4_WAD\Assignment_2B> docker run --rm --gpus all my-
nvidia-container

==========
== CUDA ==
==========

CUDA Version 12.2.0

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This container image and its contents are governed by the NVIDIA Deep Learning Container
License.
By pulling and using the container, you accept the terms and conditions of this license:
https://developer.nvidia.com/ngc/nvidia-deep-learning-container-license

A copy of this license is made available in this container at /NGC-DL-CONTAINER-LICENSE
for your convenience.

✅ GPU is available and ready to use!
```

**Step 5: Verify GPU Access Inside the Container**

Run the following command to check if the GPU is available inside the container:

```
docker run --rm --gpus all nvidia/cuda:12.2.2-runtime-ubuntu22.04 nvidia-smi
```