

**Roll No.: 33309 Batch- K-11**

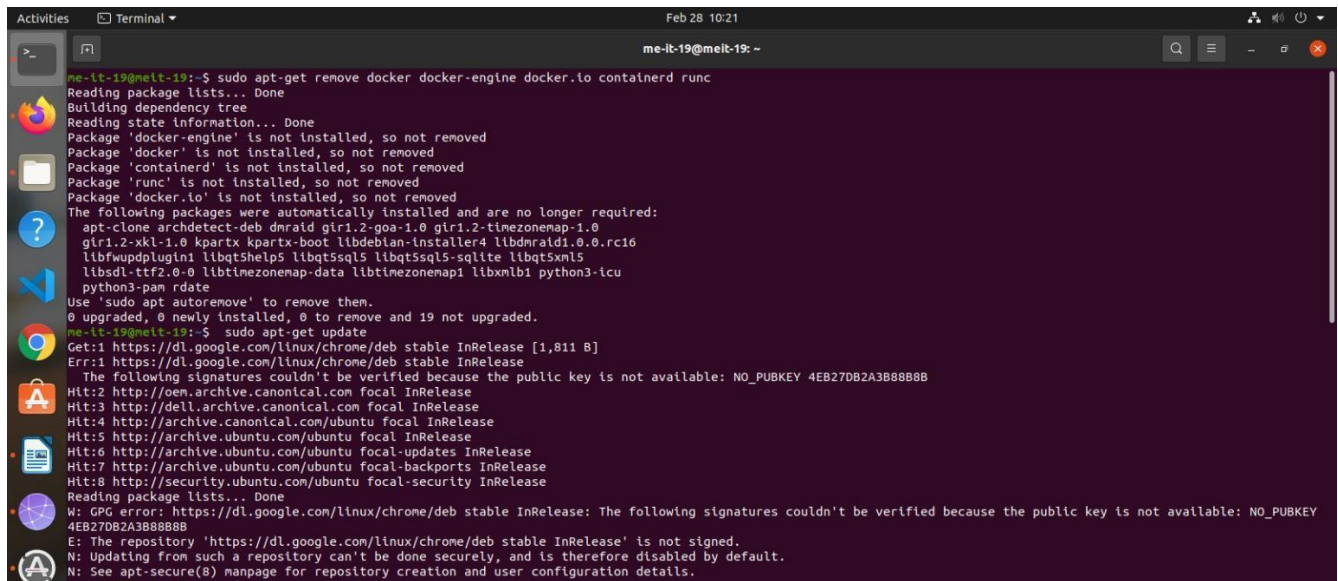
**Title: Create Docker Container Environment (NVIDEA Docker or any other).**

## Assignment No. 2-b

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### Commands:

**sudo apt-get remove docker docker-engine docker.io containerd runc**  
**sudo apt-get update**



```
me-1t-19@melt-19:~$ sudo apt-get remove docker docker-engine docker.io containerd runc
Reading package lists... Done
Building dependency tree
Reading state information... Done
Package 'docker-engine' is not installed, so not removed
Package 'docker' is not installed, so not removed
Package 'containerd' is not installed, so not removed
Package 'runc' is not installed, so not removed
Package 'docker.io' is not installed, so not removed
The following packages were automatically installed and are no longer required:
apt-cclone archdetect-deb dmraid glr1.2-gpa-1.0 glr1.2-tinezonemap-1.0
glr1.2-xml-1.0 kpartx kpartx-boot libdebian-installer4 libdmraid1.0.0.rc16
libfwupdplugin1 libqt5help5 libqt5sql5 libqt5sql5-sqlite libqt5xml5
libstd-ttf2.0 libtinezonemap-data libtinezonemap1 libxmlb1 python3-icu
python3-pam rdate
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 19 not upgraded.
me-1t-19@melt-19:~$ sudo apt-get update
Get:1 https://dl.google.com/linux/chrome/deb stable InRelease [1,811 B]
Err:1 https://dl.google.com/linux/chrome/deb stable InRelease
  The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 4EB27DB2A3B8888B
Hlt:2 http://oem.archive.canonical.com focal InRelease
Hlt:3 http://dell.archive.canonical.com focal InRelease
Hlt:4 http://archive.canonical.com/ubuntu focal InRelease
Hlt:5 http://archive.ubuntu.com/ubuntu focal InRelease
Hlt:6 http://archive.ubuntu.com/ubuntu focal-updates InRelease
Hlt:7 http://archive.ubuntu.com/ubuntu focal-backports InRelease
Hlt:8 http://security.ubuntu.com/ubuntu focal-security InRelease
Reading package lists... Done
W: GPG error: https://dl.google.com/linux/chrome/deb stable InRelease: The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 4EB27DB2A3B8888B
E: The repository 'https://dl.google.com/linux/chrome/deb stable InRelease' is not signed.
N: Updating from such a repository can't be done securely, and is therefore disabled by default.
N: See apt-secure(8) manpage for repository creation and user configuration details.
```

**sudo apt-get install \> ca-certificates \> curl \> gnupg \> lsb-release**

```
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me-it-19@melt-19:~$ sudo apt-get install \
> ca-certificates \
> curl \
> gnupg \
> lsb-release
Reading package lists... Done
Building dependency tree
Reading state information... Done
lsb-release is already the newest version (11.1.0ubuntu2).
ca-certificates is already the newest version (20211016ubuntu0.20.04.1).
curl is already the newest version (7.68.0-1ubuntu2.10).
gnupg is already the newest version (2.2.19-3ubuntu2.2).
The following packages were automatically installed and are no longer required:
apt-clone archdetect-deb dmraid gtri.2-goa-1.0 gtri.2-tlmezonemap-1.0
gtri.2-xml-1.0 kpartx kpartx-boot libdebconf-installer4 libdmraid1.0.0.rc16
libfwupdplugin1 libqt5help5 libqt5sql5 libqt5sql5-sqlite libqt5xml5
libstd-ttf2.0-0 libtlmezonemap-data libtlmezonemap1 libxmlb1 python3-icu
python3-pam rdate
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 19 not upgraded.
me-it-19@melt-19:~$ sudo mkdir -m 0755 -p /etc/apt/keyrings
me-it-19@melt-19:~$ curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo gpg --dearmor -o /etc/apt/keyrings/docker.gpg
File '/etc/apt/keyrings/docker.gpg' exists. Overwrite? (y/N) y
me-it-19@melt-19:~$ echo \
> "deb [arch=$(dpkg --print-architecture) signed-by=/etc/apt/keyrings/docker.gpg] https://download.docker.com/linux/ubuntu \
> $(lsb_release -cs) stable" | sudo tee /etc/apt/sources.list.d/docker.list > /dev/null
me-it-19@melt-19:~$ sudo apt-get update
Hit:1 https://download.docker.com/linux/ubuntu focal InRelease
Get:2 https://dl.google.com/linux/chrome/deb stable InRelease [1,811 B]
Get:3 https://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Err:2 https://dl.google.com/linux/chrome/deb stable InRelease
The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 4EB27DB2A3B88B8B
Hit:4 http://dell.archive.canonical.com focal InRelease
Hit:5 http://oem.archive.canonical.com focal InRelease
Hit:6 http://archive.canonical.com/ubuntu focal InRelease
Hit:7 http://archive.ubuntu.com/ubuntu focal InRelease
Hit:8 http://archive.ubuntu.com/ubuntu focal-updates InRelease
Hit:9 http://archive.ubuntu.com/ubuntu focal-backports InRelease
Reading package lists... Done
W: GPG error: https://dl.google.com/linux/chrome/deb stable InRelease: The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 4EB27DB2A3B88B8B
E: The repository 'https://dl.google.com/linux/chrome/deb stable InRelease' is not signed.
N: Updating from such a repository can't be done securely, and is therefore disabled by default.
N: See apt-secure(8) manpage for repository creation and user configuration details.
me-it-19@melt-19:~$ sudo chmod a+r /etc/apt/keyrings/docker.gpg
me-it-19@melt-19:~$ sudo apt-get install docker-ce docker-ce-cli containerd.io docker-buildx-plugin docker-compose-plugin
```

## sudo docker run hello-world

```
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E: The repository 'https://dl.google.com/linux/chrome/deb stable InRelease' is not signed.
N: Updating from such a repository can't be done securely, and is therefore disabled by default.
N: See apt-secure(8) manpage for repository creation and user configuration details.
me-it-19@melt-19:~$ sudo chmod a+r /etc/apt/keyrings/docker.gpg
me-it-19@melt-19:~$ sudo apt-get install docker-ce docker-ce-cli containerd.io docker-buildx-plugin docker-compose-plugin
Reading package lists... Done
Building dependency tree
Reading state information... Done
containerd.io is already the newest version (1.6.18-1).
docker-buildx-plugin is already the newest version (0.10.2-1-ubuntu.20.04-focal).
docker-ce-cli is already the newest version (5:23.0.1-1-ubuntu.20.04-focal).
docker-ce is already the newest version (5:23.0.1-1-ubuntu.20.04-focal).
docker-compose-plugin is already the newest version (2.16.0-1-ubuntu.20.04-focal).
The following packages were automatically installed and are no longer required:
apt-clone archdetect-deb dmraid gtri.2-goa-1.0 gtri.2-tlmezonemap-1.0
gtri.2-xml-1.0 kpartx kpartx-boot libdebconf-installer4 libdmraid1.0.0.rc16
libfwupdplugin1 libqt5help5 libqt5sql5 libqt5sql5-sqlite libqt5xml5
libstd-ttf2.0-0 libtlmezonemap-data libtlmezonemap1 libxmlb1 python3-icu
python3-pam rdate
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 19 not upgraded.
me-it-19@melt-19:~$ sudo docker run hello-world

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/
me-it-19@melt-19:~$
```

## sudo systemctl status docker

```
me-it-19@melt-19:~$ sudo systemctl status docker
[sudo] password for me-it-19:
● docker.service - Docker Application Container Engine
   Loaded: loaded (/lib/systemd/system/docker.service; enabled; vendor preset: enabled)
   Active: active (running) since Tue 2023-02-28 09:07:02 IST; 1h 28min ago
   TriggeredBy: ● docker.socket
     Docs: https://docs.docker.com
    Main PID: 2419 (dockerd)
      Tasks: 17
     Memory: 96.5M
    CGroup: /system.slice/docker.service
            └─2419 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.sock

Feb 28 09:07:02 melt-19 dockerd[2419]: time="2023-02-28T09:07:02.279264948+05:30" level=info msg="[graphdriver] using prior storage driver: overlay2"
Feb 28 09:07:02 melt-19 dockerd[2419]: time="2023-02-28T09:07:02.285135945+05:30" level=info msg="Loading containers: start."
Feb 28 09:07:02 melt-19 dockerd[2419]: time="2023-02-28T09:07:02.382871762+05:30" level=info msg="Default bridge (docker0) is assigned with an IP address 172.17.0.0/16"
Feb 28 09:07:02 melt-19 dockerd[2419]: time="2023-02-28T09:07:02.406777919+05:30" level=info msg="Loading containers: done."
Feb 28 09:07:02 melt-19 dockerd[2419]: time="2023-02-28T09:07:02.423996656+05:30" level=info msg="Docker daemon" commit=bc3805a graphdriver=overlay2 version=23.0.1
Feb 28 09:07:02 melt-19 dockerd[2419]: time="2023-02-28T09:07:02.424181321+05:30" level=info msg="Daemon has completed initialization"
Feb 28 09:07:02 melt-19 dockerd[2419]: time="2023-02-28T09:07:02.436357857+05:30" level=info msg="[core] [Server #7] Server created" module=grpc
Feb 28 09:07:02 melt-19 systemd[1]: Started Docker Application Container Engine.
Feb 28 09:07:02 melt-19 dockerd[2419]: time="2023-02-28T09:07:02.439275843+05:30" level=info msg="API listen on /run/docker.sock"
Feb 28 10:04:33 melt-19 dockerd[2419]: time="2023-02-28T10:04:33.596051257+05:30" level=info msg="Ignoring event" container=8c4d9875ddb5b2de827f35d9f3cf1fea6f6699d7fab8
lines 1-21/21 (END)
```

## Working with Docker Images

```
me-it-19@melt-19:~$ sudo docker search ubuntu
[sudo] password for me-it-19:
NAME                DESCRIPTION                STARS     OFFICIAL   AUTOMATED
ubuntu              Ubuntu is a Debian-based Linux operating sys... 15650     [OK]
websphere-liberty   WebSphere Liberty multi-architecture images ... 292       [OK]
open-liberty        Open Liberty multi-architecture images based... 58        [OK]
neurodebian         NeuroDebian provides neuroscience research s... 98        [OK]
ubuntu-debootstrap  DEPRECATED; use "ubuntu" instead                58        [OK]
ubuntu-upstart      DEPRECATED, as is Upstart (find other proces... 112       [OK]
ubuntu/nginx        Nginx, a high-performance reverse proxy & we... 79
ubuntu/cortex       Cortex provides storage for Prometheus. Long... 3
ubuntu/apache2      Apache, a secure & extensible open-source HT... 53
ubuntu/squid        Squid is a caching proxy for the Web. Long-t... 52
ubuntu/mysql        MySQL open source fast, stable, multi-thread... 42
ubuntu/redis        Redis, an open source key-value store. Long-... 16
ubuntu/bind9        BIND 9 is a very flexible, full-featured DNS... 46
ubuntu/prometheus   Prometheus is a systems and service monitori... 38
ubuntu/postgres     PostgreSQL is an open source object-relatio... 25
ubuntu/kafka        Apache Kafka, a distributed event streaming ... 25
ubuntu/zookeeper    ZooKeeper maintains configuration informatio... 5
ubuntu/grafana       Grafana, a feature rich metrics dashboard & ... 7
ubuntu/memcached    Memcached, in-memory keyvalue store for smal... 5
ubuntu/prometheus-alertmanager Alertmanager handles client alerts from Prom... 8
ubuntu/cassandra    Cassandra, an open source NoSQL distributed ... 2
ubuntu/dotnet-deps  Chiselled Ubuntu for self-contained .NET & A... 6
ubuntu/telegraf     Telegraf collects, processes, aggregates & w... 4
ubuntu/dotnet-runtime Chiselled Ubuntu runtime image for .NET apps... 5
ubuntu/dotnet-aspnet Chiselled Ubuntu runtime image for ASP.NET a... 3

me-it-19@melt-19:~$ sudo docker pull ubuntu
Using default tag: latest
latest: Pulling from library/ubuntu
677076032cca: Pull complete
Digest: sha256:9a0bdde4188b896a372804be2384015e90e3f84906b750c1a53539b585fbbe7f
Status: Downloaded newer image for ubuntu:latest
docker.io/library/ubuntu:latest

me-it-19@melt-19:~$ sudo docker images
REPOSITORY    TAG       IMAGE ID       CREATED        SIZE
ubuntu        latest   58db3edaf2be   4 weeks ago   77.8MB
hello-world   latest   febsd9fea6a5   17 months ago 13.3kB

me-it-19@melt-19:~$
```

## Running a Docker Container

`sudo docker run -it ubuntu root@68cb2e3a411d:/# apt update`



```
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root@68cb2e3a411d: /

me-it-19@meit-19:~$ sudo docker run -it ubuntu
root@68cb2e3a411d:/# apt update
Get:1 http://archive.ubuntu.com/ubuntu jammy InRelease [270 kB]
Get:2 http://archive.ubuntu.com/ubuntu jammy-updates InRelease [119 kB]
Get:3 http://archive.ubuntu.com/ubuntu jammy-backports InRelease [107 kB]
Get:4 http://archive.ubuntu.com/ubuntu jammy/restricted amd64 Packages [164 kB]
Get:5 http://archive.ubuntu.com/ubuntu jammy/universe amd64 Packages [17.5 MB]
Get:6 http://security.ubuntu.com/ubuntu jammy-security InRelease [110 kB]
Get:7 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 Packages [869 kB]
Get:8 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 Packages [5557 B]
Get:9 http://security.ubuntu.com/ubuntu jammy-security/restricted amd64 Packages [752 kB]
Get:10 http://security.ubuntu.com/ubuntu jammy-security/main amd64 Packages [810 kB]
Get:11 http://archive.ubuntu.com/ubuntu jammy/main amd64 Packages [1792 kB]
Get:12 http://archive.ubuntu.com/ubuntu jammy/multiverse amd64 Packages [266 kB]
Get:13 http://archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 Packages [10.9 kB]
Get:14 http://archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [808 kB]
Get:15 http://archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [1103 kB]
Get:16 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [1136 kB]
Get:17 http://archive.ubuntu.com/ubuntu jammy-backports/main amd64 Packages [49.0 kB]
Get:18 http://archive.ubuntu.com/ubuntu jammy-backports/universe amd64 Packages [22.4 kB]
Fetched 25.9 MB in 19s (1360 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
6 packages can be upgraded. Run 'apt list --upgradable' to see them.
root@68cb2e3a411d:/# apt install nodejs
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  ca-certificates javascript-common libbrotli1 libc-ares2 libicu70
  libjs-highlight.js libnghttp2-14 libnode72 libuv1 nodejs-doc openssl
Suggested packages:
  apache2 | lighttpd | httpd npm
The following NEW packages will be installed:
  ca-certificates javascript-common libbrotli1 libc-ares2 libicu70
  libjs-highlight.js libnghttp2-14 libnode72 libuv1 nodejs nodejs-doc openssl
0 upgraded, 12 newly installed, 0 to remove and 6 not upgraded.
Need to get 26.1 MB of archives.
After this operation, 93.0 MB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 openssl amd64 3.0.2-0ubuntu1.8 [1184 kB]
Get:2 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 ca-certificates all 20211016ubuntu0.22.04.1 [144 kB]
Get:3 http://archive.ubuntu.com/ubuntu jammy/main amd64 libicu70 amd64 70.1-2 [10.6 MB]
Get:4 http://archive.ubuntu.com/ubuntu jammy/main amd64 libnghttp2-14 amd64 1.43.0-1build3 [76.3 kB]
Get:5 http://archive.ubuntu.com/ubuntu jammy/main amd64 libuv1 amd64 1.43.0-1 [93.1 kB]
```

root@68cb2e3a411d:/# apt install nodejs root@68cb2e3a411d:/# node -v

## Managing Docker Containers

```
me-it-19@meit-19:~$ sudo docker ps
CONTAINER ID   IMAGE     COMMAND                  CREATED        STATUS        PORTS        NAMES
me-it-19@meit-19:~$ sudo docker ps -a
CONTAINER ID   IMAGE     COMMAND                  CREATED        STATUS        PORTS        NAMES
68cb2e3a411d   ubuntu   "/bin/bash"             6 minutes ago   Exited (0)    38 seconds ago   magical_einstein
8c4d9875dd5b   hello-world   "/hello"               41 minutes ago   Exited (0)    41 minutes ago   gallant_williamson
f22dc909100    hello-world   "/hello"               19 hours ago    Exited (0)    19 hours ago    bold_torvalds
me-it-19@meit-19:~$ sudo docker ps -l
CONTAINER ID   IMAGE     COMMAND                  CREATED        STATUS        PORTS        NAMES
68cb2e3a411d   ubuntu   "/bin/bash"             6 minutes ago   Exited (0)    54 seconds ago   magical_einstein
me-it-19@meit-19:~$ sudo docker start 68cb2e3a411d
68cb2e3a411d
me-it-19@meit-19:~$ sudo docker ps
CONTAINER ID   IMAGE     COMMAND                  CREATED        STATUS        PORTS        NAMES
68cb2e3a411d   ubuntu   "/bin/bash"             7 minutes ago   Up 28 seconds   magical_einstein
me-it-19@meit-19:~$ sudo docker stop magical_einstein
magical_einstein
me-it-19@meit-19:~$
```

## Committing Changes in a Container to a Docker Image

**docker commit -m "What you did to the image" -a "Author Name" container\_id repository/new\_image\_name**

```
me-it-19@meit-19:~$ sudo docker ps
CONTAINER ID   IMAGE     COMMAND                  CREATED        STATUS        PORTS        NAMES
68cb2e3a411d   ubuntu   "/bin/bash"             7 minutes ago Up 28 seconds          magical_einstein
me-it-19@meit-19:~$ sudo docker stop magical_einstein
me-it-19@meit-19:~$ sudo docker commit -m "added Node.js" -a "sakshi" 68cb2e3a411d sakshi/ubuntu-nodejs
sha256:53bfeeebbb7970d614755a94f86b24a7227cf857977c711e11dad1a70a63c0c
me-it-19@meit-19:~$ sudo docker images
REPOSITORY          TAG         IMAGE ID      CREATED        SIZE
sakshi/ubuntu-nodejs latest      53bfeeebbb79 14 seconds ago 203MB
ubuntu              latest     58db3edaf2be 4 weeks ago    77.8MB
hello-world         latest     feb5d9fea6a5 17 months ago 13.3kB
me-it-19@meit-19:~$
```

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