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Assignment No. 2B

Installation steps for Docker Engine:

Reference: <https://docs.docker.com/engine/install/ubuntu/>

```
blab-03@blab03-OptiPlex-5060:~$ sudo apt-get update
```

```
Hit:1 http://packages.microsoft.com/repos/code stable InRelease
Hit:2 https://dl.google.com/linux/chrome/deb stable InRelease
Get:3 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Hit:4 https://packages.microsoft.com/repos/vscode stable InRelease
Hit:5 http://in.archive.ubuntu.com/ubuntu focal InRelease
Hit:6 http://in.archive.ubuntu.com/ubuntu focal-updates InRelease
Hit:7 http://in.archive.ubuntu.com/ubuntu focal-backports InRelease
Fetched 114 kB in 1s (76.6 kB/s)
Reading package lists... Done
```

```
blab-03@blab03-OptiPlex-5060:~$ sudo apt-get remove docker docker-engine docker.io containerd runc
```

```
Reading package lists... Done
Building dependency tree
Reading state information... Done
E: Unable to locate package docker-engine
```

```
blab-03@blab03-OptiPlex-5060:~$ sudo apt-get update
```

```
Get:1 http://packages.microsoft.com/repos/code stable InRelease [10.4 kB]
Hit:2 https://dl.google.com/linux/chrome/deb stable InRelease
Hit:3 https://packages.microsoft.com/repos/vscode stable InRelease
Hit:4 http://in.archive.ubuntu.com/ubuntu focal InRelease
Hit:5 http://security.ubuntu.com/ubuntu focal-security InRelease
Hit:6 http://in.archive.ubuntu.com/ubuntu focal-updates InRelease
Hit:7 http://in.archive.ubuntu.com/ubuntu focal-backports InRelease
Fetched 10.4 kB in 2s (6,731 B/s)
Reading package lists... Done
```

```
blab-03@blab03-OptiPlex-5060:~$ 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).
lsb-release set to manually installed.
ca-certificates is already the newest version (20211016ubuntu0.20.04.1).
gnupg is already the newest version (2.2.19-3ubuntu2.2).
gnupg set to manually installed.
The following packages were automatically installed and are no longer required:
gir1.2-goa-1.0 libfwupdplugin1 libxmlb1
Use 'sudo apt autoremove' to remove them.
The following NEW packages will be installed:
curl
0 upgraded, 1 newly installed, 0 to remove and 1 not upgraded.
Need to get 161 kB of archives.
After this operation, 413 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 curl amd64 7.68.0-1ubuntu2.15 [161 kB]
```

```
Fetched 161 kB in 1s (276 kB/s)
Selecting previously unselected package curl.
(Reading database ... 209156 files and directories currently installed.)
Preparing to unpack .../curl_7.68.0-1ubuntu2.15_amd64.deb ...
Unpacking curl (7.68.0-1ubuntu2.15) ...
Setting up curl (7.68.0-1ubuntu2.15) ...
Processing triggers for man-db (2.9.1-1) ...
```

```
blab-03@blab03-OptiPlex-5060:~$ sudo mkdir -m 0755 -p /etc/apt/keyrings
```

```
blab-03@blab03-OptiPlex-5060:~$ curl -fsSL
https://download.docker.com/linux/ubuntu/gpg | sudo gpg --dearmor -o
/etc/apt/keyrings/docker.gpg
```

```
blab-03@blab03-OptiPlex-5060:~$ 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
```

```
blab-03@blab03-OptiPlex-5060:~$ sudo apt-get update
```

```
Get:1 https://download.docker.com/linux/ubuntu focal InRelease [57.7 kB]
Get:2 http://packages.microsoft.com/repos/code stable InRelease [10.4 kB]
Get:3 https://download.docker.com/linux/ubuntu focal/stable amd64 Packages [24.7 kB]
Hit:4 https://packages.microsoft.com/repos/vscode stable InRelease
Hit:5 https://dl.google.com/linux/chrome/deb stable InRelease
Hit:6 http://security.ubuntu.com/ubuntu focal-security InRelease
Hit:7 http://in.archive.ubuntu.com/ubuntu focal InRelease
Hit:8 http://in.archive.ubuntu.com/ubuntu focal-updates InRelease
Hit:9 http://in.archive.ubuntu.com/ubuntu focal-backports InRelease
Fetched 92.8 kB in 2s (59.2 kB/s)
Reading package lists... Done
```

```
blab-03@blab03-OptiPlex-5060:~$ sudo chmod a+r /etc/apt/keyrings/docker.gpg
```

```
blab-03@blab03-OptiPlex-5060:~$ sudo apt-get update
```

```
Hit:1 https://download.docker.com/linux/ubuntu focal InRelease
Get:2 http://packages.microsoft.com/repos/code stable InRelease [10.4 kB]
Hit:3 https://packages.microsoft.com/repos/vscode stable InRelease
Hit:4 http://in.archive.ubuntu.com/ubuntu focal InRelease
Hit:5 https://dl.google.com/linux/chrome/deb stable InRelease
Hit:6 http://security.ubuntu.com/ubuntu focal-security InRelease
Hit:7 http://in.archive.ubuntu.com/ubuntu focal-updates InRelease
Hit:8 http://in.archive.ubuntu.com/ubuntu focal-backports InRelease
Fetched 10.4 kB in 1s (8,228 B/s)
Reading package lists... Done
```

```
blab-03@blab03-OptiPlex-5060:~$ 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
The following packages were automatically installed and are no longer required:
gir1.2-goa-1.0 libfwupdplugin1 libxmlb1
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
docker-ce-rootless-extras docker-scan-plugin pigz slirp4netns
Suggested packages:
aufs-tools cgroupfs-mount | cgroup-lite
The following NEW packages will be installed:
containerd.io docker-buildx-plugin docker-ce docker-ce-cli
docker-ce-rootless-extras docker-compose-plugin docker-scan-plugin pigz
slirp4netns
0 upgraded, 9 newly installed, 0 to remove and 1 not upgraded.
Need to get 112 MB of archives.
After this operation, 401 MB of additional disk space will be used.
```

```
Do you want to continue? [Y/n] y
Get:1 https://download.docker.com/linux/ubuntu focal/stable amd64 containerd.io amd64 1.6.18-1 [28.2 MB]
Get:2 http://in.archive.ubuntu.com/ubuntu focal/universe amd64 pigz amd64 2.4-1 [57.4 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu focal/universe amd64 slirp4netns amd64 0.4.3-1 [74.3 kB]
Get:4 https://download.docker.com/linux/ubuntu focal/stable amd64 docker-buildx-plugin amd64 0.10.2-1~ubuntu.20.04~focal
[25.9 MB]
Get:5 https://download.docker.com/linux/ubuntu focal/stable amd64 docker-ce-cli amd64 5:23.0.1-1~ubuntu.20.04~focal [13.2
MB]
Get:6 https://download.docker.com/linux/ubuntu focal/stable amd64 docker-ce amd64 5:23.0.1-1~ubuntu.20.04~focal [22.0 MB]
Get:7 https://download.docker.com/linux/ubuntu focal/stable amd64 docker-ce-rootless-extras amd64 5:23.0.1-
1~ubuntu.20.04~focal [8,765 kB]
Get:8 https://download.docker.com/linux/ubuntu focal/stable amd64 docker-compose-plugin amd64 2.16.0-1~ubuntu.20.04~focal
[10.2 MB]
Get:9 https://download.docker.com/linux/ubuntu focal/stable amd64 docker-scan-plugin amd64 0.23.0~ubuntu-focal [3,622 kB]
Fetched 112 MB in 1min 3s (1,785 kB/s)
Setting up slirp4netns (0.4.3-1) ...
Setting up docker-scan-plugin (0.23.0~ubuntu-focal) ...
Setting up docker-buildx-plugin (0.10.2-1~ubuntu.20.04~focal) ...
Setting up containerd.io (1.6.18-1) ...
Created symlink /etc/systemd/system/multi-user.target.wants/containerd.service → /lib/systemd/system/containerd.service.
Setting up docker-compose-plugin (2.16.0-1~ubuntu.20.04~focal) ...
Setting up docker-ce-cli (5:23.0.1-1~ubuntu.20.04~focal) ...
Setting up pigz (2.4-1) ...
Setting up docker-ce-rootless-extras (5:23.0.1-1~ubuntu.20.04~focal) ...
Setting up docker-ce (5:23.0.1-1~ubuntu.20.04~focal) ...
Created symlink /etc/systemd/system/multi-user.target.wants/docker.service → /lib/systemd/system/docker.service.
Created symlink /etc/systemd/system/sockets.target.wants/docker.socket → /lib/systemd/system/docker.socket.
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for systemd (245.4-4ubuntu3.19) ...
```

blab-03@blab03-OptiPlex-5060:~\$ sudo docker run hello-world

```
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
2db29710123e: Pull complete
Digest: sha256:6e8b6f026e0b9c419ea0fd02d3905dd0952ad1fee67543f525c73a0a790fefb
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/>

blab-03@blab03-OptiPlex-5060:~\$ docker version

Client: Docker Engine - Community

Version: 23.0.1

API version: 1.42

Go version: go1.19.5

Git commit: a5ee5b1

Built: Thu Feb 9 19:46:56 2023

OS/Arch: linux/amd64

Context: default

Containerizing docker application:

Reference: https://docs.docker.com/get-started/02_our_app/

1. Clone the getting-started repository using the following command:

```
blab-03@blab03-OptiPlex-5060:~/33373/WAD/Assignment 2B$ git clone https://github.com/docker/getting-started.git
```

```
Cloning into 'getting-started'...
remote: Enumerating objects: 952, done.
remote: Total 952 (delta 0), reused 0 (delta 0), pack-reused 952
Receiving objects: 100% (952/952), 5.18 MiB | 1.52 MiB/s, done.
Resolving deltas: 100% (540/540), done.
```

2. Inside /getting-started/app/ create **Dockerfile** and insert the following code in it:

```
blab-03@blab03-OptiPlex-5060:~/33373/WAD/Assignment 2B$ cd getting-started/
blab-03@blab03-OptiPlex-5060:~/33373/WAD/Assignment 2B/getting-started$ cd app
blab-03@blab03-OptiPlex-5060:~/33373/WAD/Assignment 2B/getting-started/app$ touch Dockerfile
```

Code for Dockerfile:

```
# syntax=docker/dockerfile:1
```

```
FROM node:18-alpine
WORKDIR /app
COPY . .
RUN yarn install --production
CMD ["node", "src/index.js"]
EXPOSE 3000
```

3. Build the app's container image:

```
blab-03@blab03-OptiPlex-5060:~/33373/WAD/Assignment 2B/getting-started/app$ sudo usermod -aG docker $USER
```

```
blab-03@blab03-OptiPlex-5060:~/33373/WAD/Assignment 2B/getting-started/app$ newgrp docker
```

```
blab-03@blab03-OptiPlex-5060:~/33373/WAD/Assignment 2B/getting-started/app$ 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

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For more examples and ideas, visit:

<https://docs.docker.com/get-started/>

**blab-03@blab03-OptiPlex-5060:~/33373/WAD/Assignment 2B/getting-started/app\$
docker build -t getting-started .**

```
[+] Building 74.2s (11/11) FINISHED
=> [internal] load .dockerignore                                0.8s
=> => transferring context: 2B                                  0.0s
=> [internal] load build definition from Dockerfile              1.0s
=> => transferring dockerfile: 185B                             0.0s
=> resolve image config for docker.io/docker/dockerfile:1      4.0s
=> docker-image://docker.io/docker/dockerfile:1@sha256:39b85bbfa7536a5feceb7372a0817649ecb2724562a38360f4d6a778
8.4s
=> => resolve docker.io/docker/dockerfile:1@sha256:39b85bbfa7536a5feceb7372a0817649ecb2724562a38360f4d6a7782a40
0.4s
=> => sha256:39b85bbfa7536a5feceb7372a0817649ecb2724562a38360f4d6a7782a409b14 8.40kB / 8.40kB      0.0s
=> => sha256:966d40f9ba8366e74c2fa353fc0bc7bbc167d2a0f3ad2420db8b9e633049462d 482B / 482B      0.0s
=> => sha256:dbdd11720762ad504260c66161c964e59eba06b95a7aa64a68634b598a830a91 2.90kB / 2.90kB      0.0s
=> => sha256:a47ff7046597eea0123ea02817165350e3680f75000dc5d69c9a310258e1bedd 11.55MB / 11.55MB
7.0s
=> => extracting sha256:a47ff7046597eea0123ea02817165350e3680f75000dc5d69c9a310258e1bedd          0.1s
=> [internal] load metadata for docker.io/library/node:18-alpine 3.5s
=> [1/4] FROM docker.io/library/node:18-alpine@sha256:f8a51c36b0be7434bbf867d4a08decf0100e656203d893b9b0f8b1fe
35.8s
=> => resolve docker.io/library/node:18-alpine@sha256:f8a51c36b0be7434bbf867d4a08decf0100e656203d893b9b0f8b1fe9
0.3s
=> => sha256:f8a51c36b0be7434bbf867d4a08decf0100e656203d893b9b0f8b1fe9e40daea 1.43kB / 1.43kB      0.0s
=> => sha256:fdbd2737cb94e25cae3db9fc5d7dc073c9675dad34239bfb3948c499a6908c19 1.16kB / 1.16kB      0.0s
=> => sha256:9423415aa47ab401c3f202dd56fdf379f6161a620cc51caa048887d9bddd246 6.44kB / 6.44kB      0.0s
=> => sha256:63b65145d645c1250c391b2d16ebe53b3747c295ca8ba2fcb6b0cf064a4dc21c 3.37MB / 3.37MB      6.3s
=> => sha256:478140d591162fa9113c5ba76c16afafe2aa04bccd8ec45c232ffeb4f31e9c23 2.35MB / 2.35MB      5.8s
=> => sha256:061765f30124ad9dd30397cf60c64741d3fb3b34c36f9566796687b1299183f5 47.51MB / 47.51MB      32.1s
=> => sha256:00ca3aba45c3a9811387d943d26291284ca6f938036760fcf85dbb2ab78e496a 450B / 450B      6.3s
=> => extracting sha256:63b65145d645c1250c391b2d16ebe53b3747c295ca8ba2fcb6b0cf064a4dc21c          0.1s
=> => extracting sha256:061765f30124ad9dd30397cf60c64741d3fb3b34c36f9566796687b1299183f5          0.7s
=> => extracting sha256:478140d591162fa9113c5ba76c16afafe2aa04bccd8ec45c232ffeb4f31e9c23          0.1s
=> => extracting sha256:00ca3aba45c3a9811387d943d26291284ca6f938036760fcf85dbb2ab78e496a          0.0s
=> [internal] load build context                                0.6s
=> => transferring context: 4.59MB                                0.0s
=> [2/4] WORKDIR /app                                          2.2s
=> [3/4] COPY . .                                              0.9s
=> [4/4] RUN yarn install --production                        14.3s
=> exporting to image                                          2.9s
=> => exporting layers                                          2.8s
=> => writing image sha256:e055a9bc58c3a391990e7aa8e7d669dc6ad15f833a536598fca06919de5e5b5          0.0s
=> => naming to docker.io/library/getting-started              0.0s
```

**blab-03@blab03-OptiPlex-5060:~/33373/WAD/Assignment 2B/getting-started/app\$
docker run -dp 3000:3000 getting-started**
3c3f6fa95797d57fc6d61102f180b53c415189be306f8db4fdefa157ab167a27

4. Run the container on following url: <http://localhost:3000/>

Output:

