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**Class :- D20B**

**Roll No:- 57**

**Experiment no :- 10**

**Aim: To Study and implement containerization using DOCKER.**

**Theory :-**

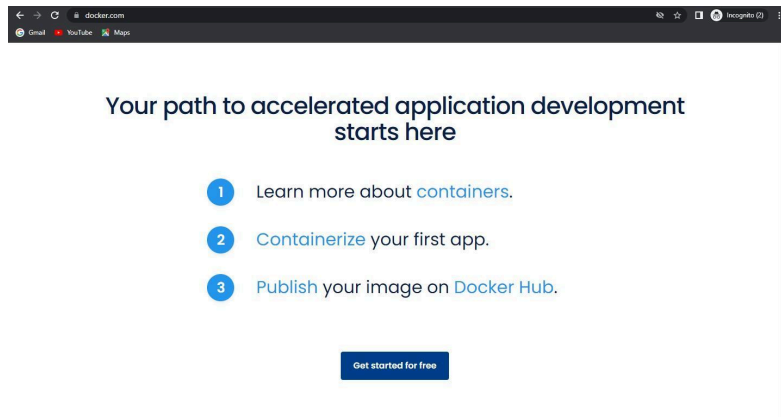
Containerization is a technique used to package an application and its dependencies together, ensuring that it runs seamlessly in any environment. Docker is a popular tool for containerization. Here's a brief overview of the key concepts:

1. Containers: Containers are lightweight, standalone, executable packages of software that include everything needed to run a piece of software, including the code, runtime, libraries, and dependencies.
2. Images: Images are read-only templates that contain the application and its dependencies. They are used to create containers.
3. Dockerfile: A Dockerfile is a text file that contains instructions for building a Docker image. It specifies the base image, dependencies to install, and commands to run.
4. Docker Hub: Docker Hub is a cloud-based registry service that allows you to store and share Docker images.
5. Docker Compose: Docker Compose is a tool used to define and run multi-container Docker applications. It uses a YAML file to configure the application's services.
6. Docker Swarm: Docker Swarm is a clustering and scheduling tool for Docker containers. It allows you to create and manage a cluster of Docker nodes.

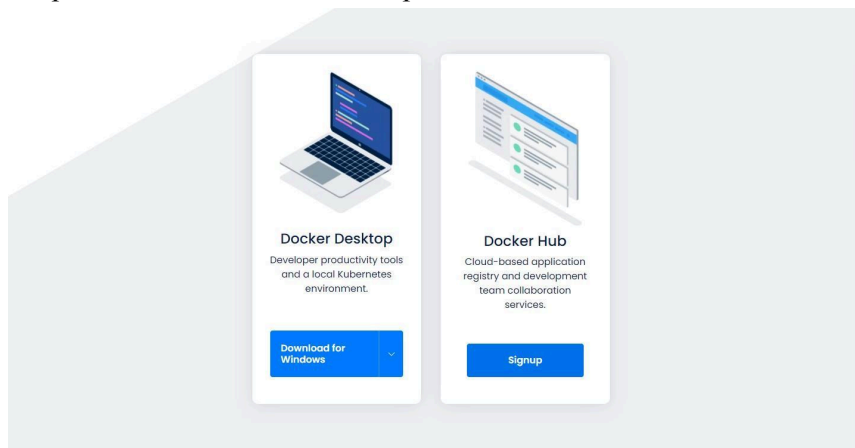
To start learning Docker, you can begin by installing Docker on your machine and exploring its documentation and tutorials. Practice building and running containers, creating Dockerfiles, and using Docker Compose to manage multi-container applications.

**Steps :**

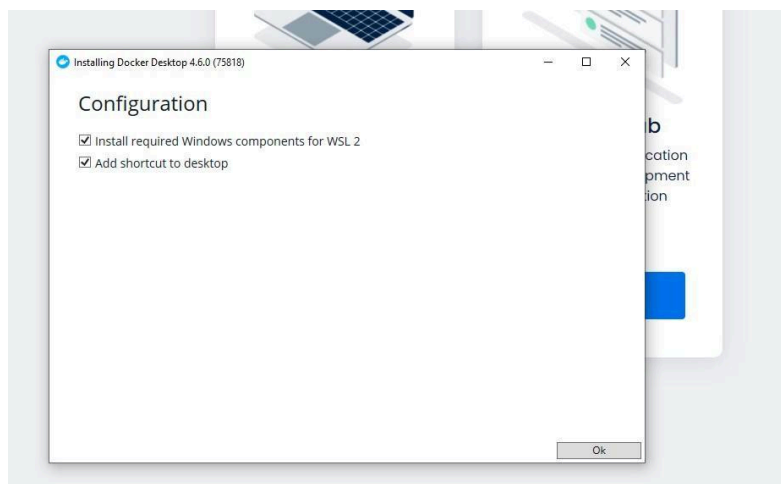
Step 01: Open [docker.com](https://docker.com) Scroll down, Click on 'Get started for free' tab.



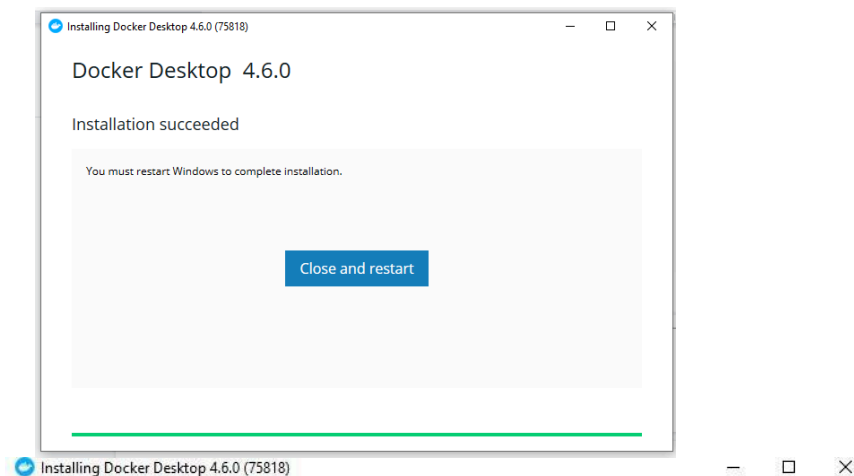
Step 02: Click on Docker Desktop, Download it.



Step 03: After downloading, Open 'Docker Desktop Installer' & start installation.



Step 04: After Installation, Restart your device.



## Docker Desktop 4.6.0

Unpacking files...

```
Unpacking file: resources/docker-desktop.iso
Unpacking file: resources/ddvp.ico
Unpacking file: resources/config-options.json
Unpacking file: resources/componentsVersion.json
Unpacking file: resources/bin/docker-compose
Unpacking file: resources/bin/docker
Unpacking file: resources/.gitignore
Unpacking file: InstallerCli.pdb
Unpacking file: InstallerCli.exe.config
Unpacking file: frontend/vk_swiftshader_icd.json
Unpacking file: frontend/v8_context_snapshot.bin
Unpacking file: frontend/snapshot_blob.bin
Unpacking file: frontend/resources/regedit/vbs/util.vbs
Unpacking file: frontend/resources/regedit/vbs/regUtil.vbs
```

Step 05: Accept the terms and conditions, Click on Accept.

**Our Service Agreement has Changed**

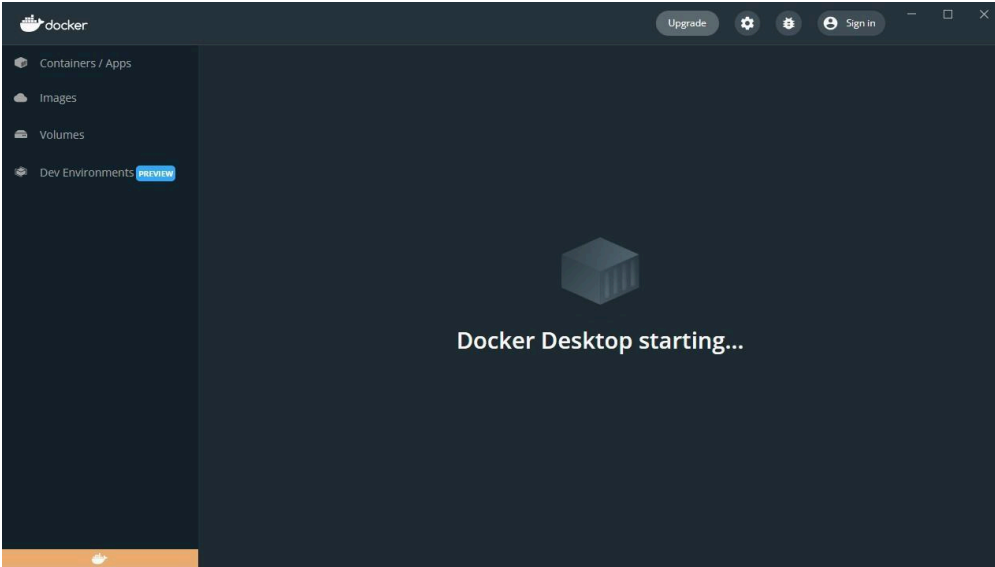
We've updated the [Docker Subscription Service Agreement](#). Please read the [Blog](#) and [FAQs](#) to learn how companies using Docker Desktop may be affected. By checking "I accept the terms" you agree to the [Subscription Service Agreement](#), the [Data Processing Agreement](#), and the [Data Privacy Policy](#).

Here's a summary of key changes:

- Our Docker Subscription Service Agreement include a change to the terms of use for Docker Desktop.
  - It **remains free** for small businesses (fewer than 250 employees AND less than \$10 million in annual revenue), personal use, education, and non-commercial open source projects.
  - It requires a paid subscription for professional use in larger enterprises.
- The effective date of these terms is August 31, 2021. There was a **grace period** until January 31, 2022 for those that require a paid subscription to use Docker Desktop. Docker trusts our customers to be in compliance and Docker Desktop will continue to function normally after January 31st, but this is a

I accept the terms ☒

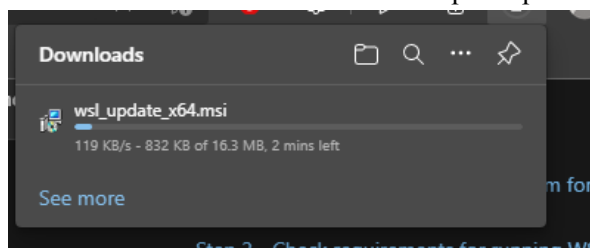
[View Full Terms](#) [Decline and Close Application](#) [Accept](#)



step 06 :- The following window should pop up. Click on the link <https://aka.ms/wsl2kernel>. do not close this window.



Download the WSL2 Linux kernel update package for x64 machines.



## Step 4 - Download the Linux kernel update package

1. Download the latest package:

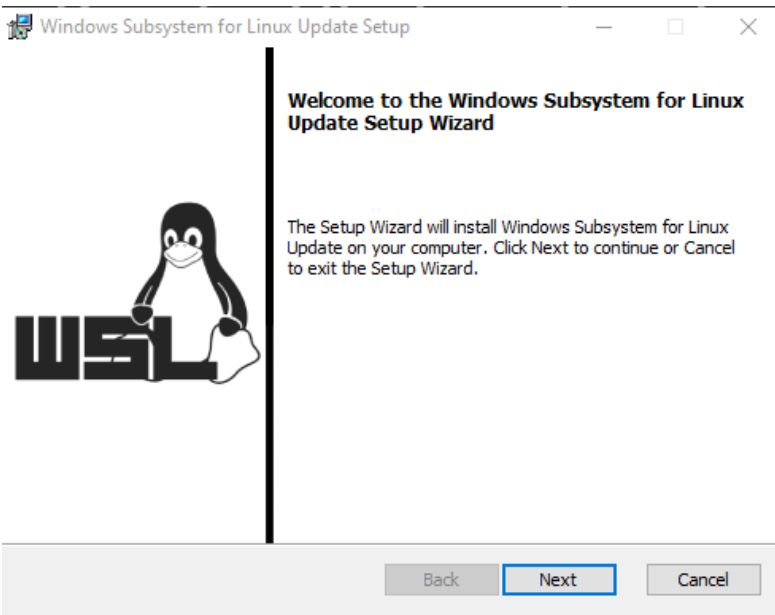
- [WSL2 Linux kernel update package for x64 machines](#)

### Note

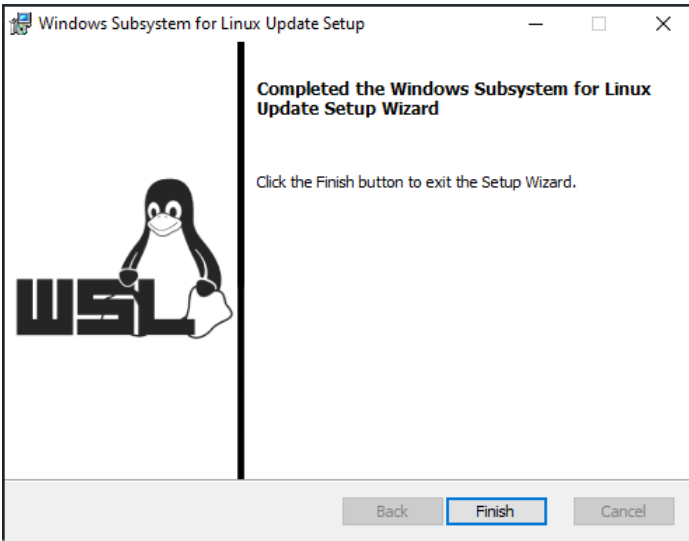
If you're using an ARM64 machine, please download the [ARM64 package](#) instead. If you're not sure what kind of machine you have, open Command Prompt or PowerShell and enter: `systeminfo | find "System Type"`. **Caveat:** On non-English Windows versions, you might have to modify the search text, translating the "System Type" string. You may also need to escape the quotations for the find command. For example, in German `systeminfo | find '"Systemtyp"'`.

2. Run the update package downloaded in the previous step. (Double-click to run - you will be prompted for elevated permissions, select 'yes' to approve this installation.)

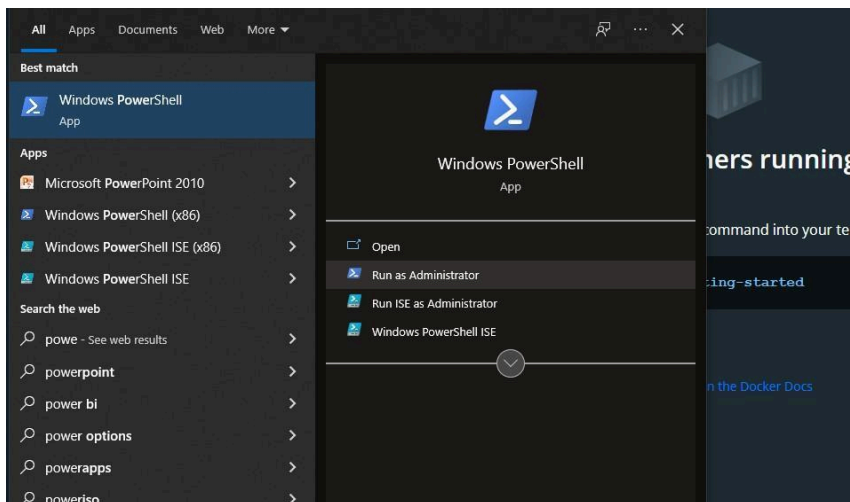
After Download is complete, Run the *.msi* package. Click on next.



After, the setup is complete, Click on finish.



Open Powershell as an Administrator.



Run the following Command:

*wsl --set-default-version 2*

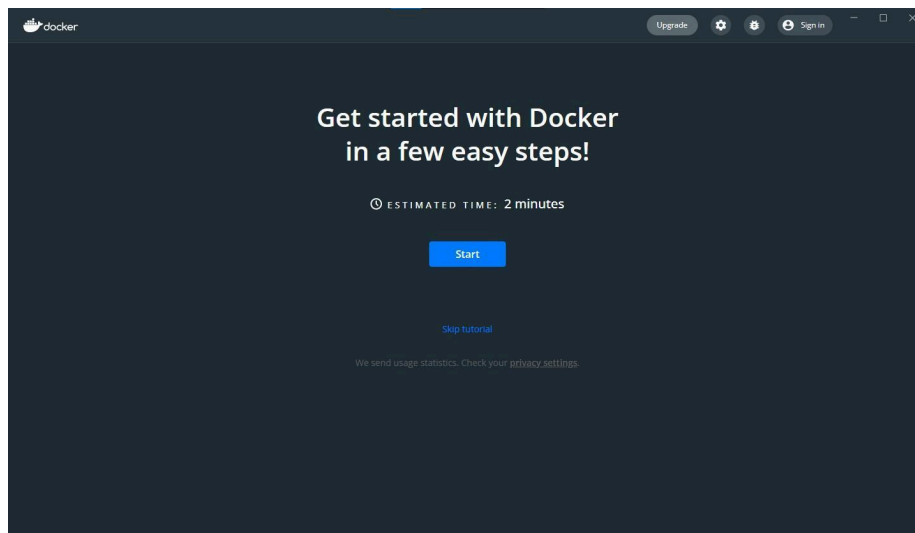
```
PS C:\WINDOWS\system32> wsl --set-default-version 2
For information on key differences with WSL 2 please visit https://aka.ms/ws12
The operation completed successfully.
PS C:\WINDOWS\system32>
```

Now, Click on Restart

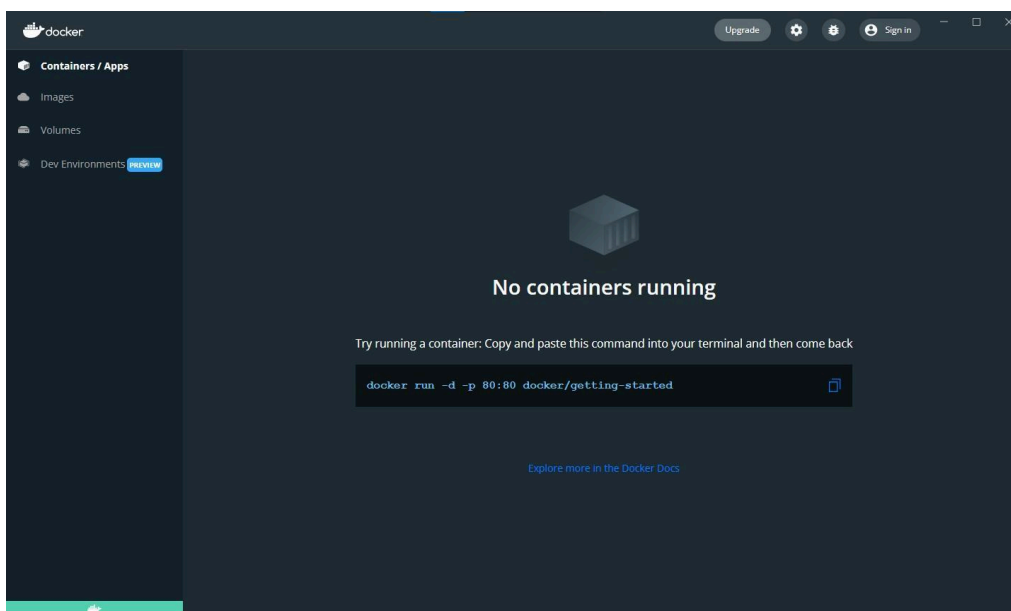
Now, Click on Restart



Docker should now restart. Click on Start.



The following window should pop up. This means, Installation is now complete.



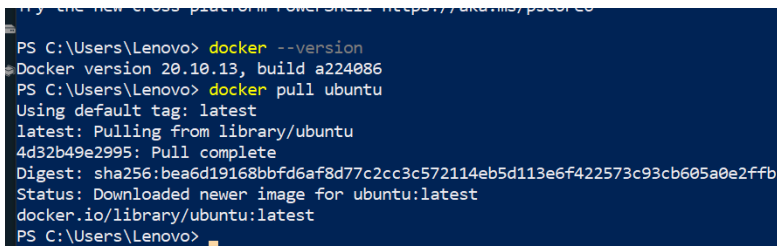
Open Command Prompt, run the following commands:

1) To check the version of Docker:

`docker --version`

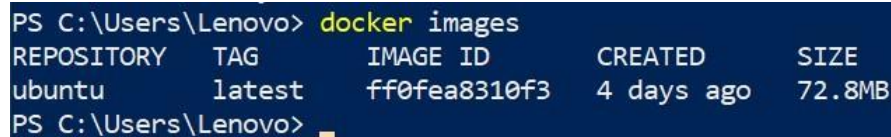
2) To install image of ubuntu

`docker pull ubuntu`



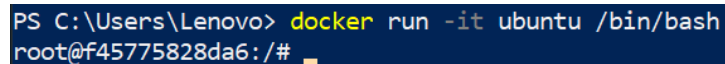
```
PS C:\Users\Lenovo> docker --version
Docker version 20.10.13, build a224086
PS C:\Users\Lenovo> docker pull ubuntu
Using default tag: latest
latest: Pulling from library/ubuntu
4d32b49e2995: Pull complete
Digest: sha256:bea6d19168bbfd6af8d77c2cc3c572114eb5d113e6f422573c93cb605a0e2ffb
Status: Downloaded newer image for ubuntu:latest
docker.io/library/ubuntu:latest
PS C:\Users\Lenovo>
```

3) Check downloaded images, docker images



```
PS C:\Users\Lenovo> docker images
REPOSITORY    TAG       IMAGE ID       CREATED        SIZE
ubuntu        latest    ff0fea8310f3   4 days ago    72.8MB
PS C:\Users\Lenovo>
```

4) Run ubuntu OS `docker run -it ubuntu /bin/bash`



```
PS C:\Users\Lenovo> docker run -it ubuntu /bin/bash
root@f45775828da6:/#
```

5) Open another Command Prompt and follow the steps shown below.

`-docker ps`

`docker container ls -a`

`docker container rm b71e3e6b1118` //copy docker id for remove but first

(Use your container ID in the above command)

stop your docker

- `docker container stop b71e3e6b1118`

- `docker container rm b71e3e6b1118`

- `docker ps`

- `docker` //list all docker commands

- `docker images`

- `docker image rm ff0fea8310f3` // copy image id from previous output (Use your image ID in the above command)

- `docker run -it ubuntu /bin/bash` //check output



```

PS C:\Users\Lenovo> docker ps
CONTAINER ID   IMAGE     COMMAND                  CREATED        STATUS        PORTS        NAMES
f45775828da6   ubuntu   "/bin/bash"             About a minute ago    Up About a minute           nostalgic_elion
PS C:\Users\Lenovo> docker container ls -a
CONTAINER ID   IMAGE     COMMAND                  CREATED        STATUS        PORTS        NAMES
f45775828da6   ubuntu   "/bin/bash"             About a minute ago    Up About a minute           nostalgic_elion
PS C:\Users\Lenovo> docker container rm f45775828da6
Error response from daemon: You cannot remove a running container f45775828da6297e793470cd07835cf764532a3d5eded8e4094ffc
b0c0f687858. Stop the container before attempting removal or force remove
PS C:\Users\Lenovo> docker container stop f45775828da6
f45775828da6
PS C:\Users\Lenovo> docker container rm f45775828da6
f45775828da6
PS C:\Users\Lenovo> docker ps
CONTAINER ID   IMAGE     COMMAND                  CREATED        STATUS        PORTS        NAMES
PS C:\Users\Lenovo> docker images
REPOSITORY    TAG       IMAGE ID       CREATED        SIZE
ubuntu        latest   ff0fea8310f3   4 days ago    72.8MB
PS C:\Users\Lenovo> docker image rm f45775828da6
Error: No such image: f45775828da6
PS C:\Users\Lenovo> docker image rm ff0fea8310f3
Untagged: ubuntu:latest
Untagged: ubuntu@sha256:bea6d19168bbfd6af8d77c2cc3c572114eb5d113e6f422573c93cb605a0e2ffb
Deleted: sha256:ff0fea8310f3957d9b1e6ba494f3e4b63cb348c76160c6c15578e65995ffaa87
Deleted: sha256:867d0767a47c392f80acb51572851923d6d3e55289828b0cd84a96ba342660c7
PS C:\Users\Lenovo> docker images
REPOSITORY    TAG       IMAGE ID       CREATED        SIZE
PS C:\Users\Lenovo>

```

### conclusion:-

Docker is a tool for containerization, allowing you to package and run applications with their dependencies in a consistent environment. It simplifies deployment and scaling, making it easier to develop and manage applications.