APPLICATION CONTAINERIZATION AND ORCHESTRATION LAB

STUDENT   **SUBMITTED TO**
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B4

STEP 1: INSTALLING DOCKER FOR MACBOOK INTEL CHIP

STEP 2: LAUNCH DOCKER

Once the installation is complete, you can launch Docker from your Applications folder or Spotlight search. The first time you launch Docker, it will ask for permissions to run. Follow the prompts to grant the necessary permissions.

STEP 3: VERIFY INSTALLATION:

Open Terminal and run the following command to verify that Docker is properly installed and running:

```
[Sachins-MacBook-Air:~ sachinaggarwal$ docker version
Client:
 Cloud integration: v1.0.31
 Version:           20.10.23
 API version:       1.41
 Go version:        go1.18.10
 Git commit:        7155243
 Built:             Thu Jan 19 17:35:19 2023
 OS/Arch:           darwin/arm64
 Context:           desktop-linux
 Experimental:      true

Server: Docker Desktop 4.17.0 (99724)
 Engine:
  Version:          20.10.23
  API version:      1.41 (minimum version 1.12)
  Go version:       go1.18.10
  Git commit:       6051f14
  Built:            Thu Jan 19 17:31:28 2023
  OS/Arch:          linux/arm64
  Experimental:     false
 containerd:
  Version:          1.6.18
  GitCommit:        2456e983eb9e37e47538f59ea18f2043c9a73640
 runc:
  Version:          1.1.4
  GitCommit:        v1.1.4-0-g5fd4c4d
 docker-init:
  Version:          0.19.0
  GitCommit:        de40ad0
```
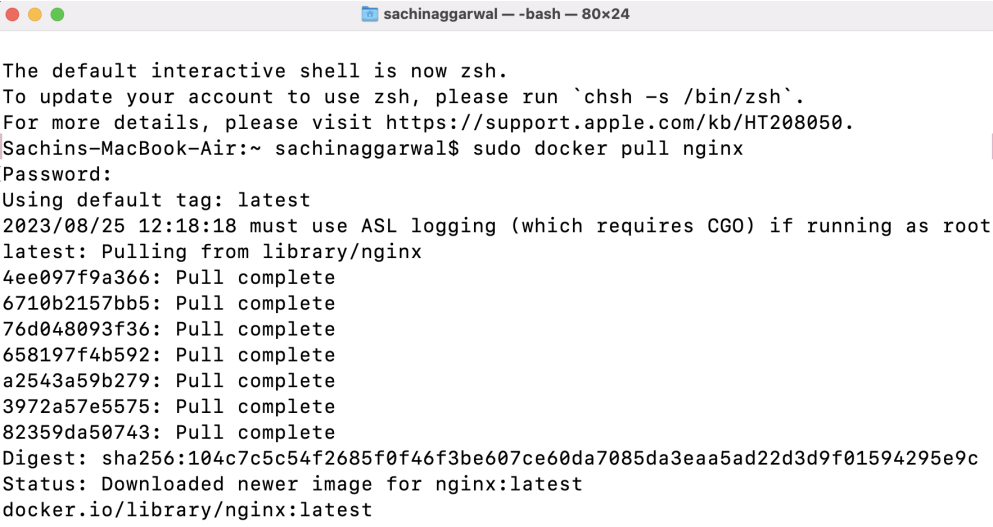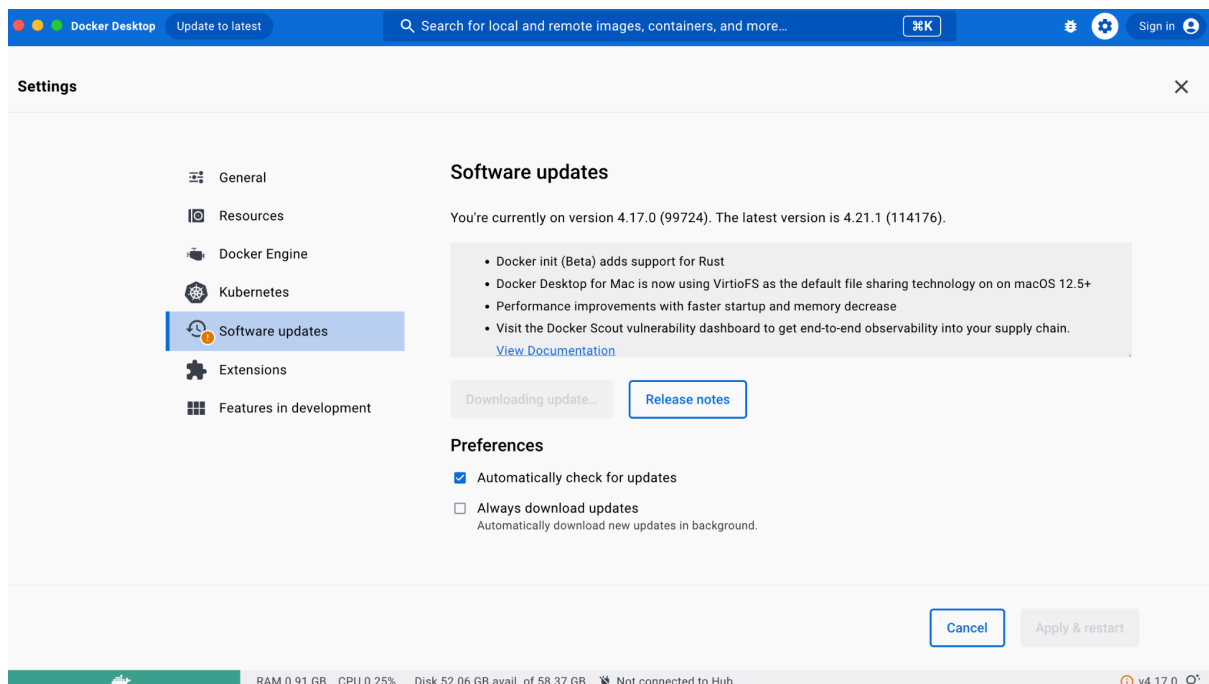
PERFORMING CRUD OPERATION ON CONTAINERS

Steps to be followed:

1. Pulling a Docker image
2. Creating a new container
3. Stopping the container
4. Listing all the containers
5. Deleting the container
6. Removing the image

Step 1: Pulling a Docker image

1.1 Open the terminal and pull an image using the command: sudo docker pull nginx

```
                    sachinaggarwal — -bash — 80×24

The default interactive shell is now zsh.
To update your account to use zsh, please run `chsh -s /bin/zsh`.
For more details, please visit https://support.apple.com/kb/HT208050.
Sachins-MacBook-Air:~ sachinaggarwal$ sudo docker pull nginx
Password:
Using default tag: latest
2023/08/25 12:18:18 must use ASL logging (which requires CGO) if running as root
latest: Pulling from library/nginx
4ee097f9a366: Pull complete
6710b2157bb5: Pull complete
76d048093f36: Pull complete
658197f4b592: Pull complete
a2543a59b279: Pull complete
3972a57e5575: Pull complete
82359da50743: Pull complete
Digest: sha256:104c7c5c54f2685f0f46f3be607ce60da7085da3eaa5ad22d3d9f01594295e9c
Status: Downloaded newer image for nginx:latest
docker.io/library/nginx:latest

What's Next?
  View summary of image vulnerabilities and recommendations → docker scout quick
view nginx
```

1.2 List all the docker images to check the newly pulled nginx image:

sudo docker images

```
Sachins-MacBook-Air:~ sachinaggarwal$ docker --version
Docker version 24.0.2, build cb74dfc
Sachins-MacBook-Air:~ sachinaggarwal$ docker images
REPOSITORY      TAG      IMAGE ID       CREATED         SIZE
nginx           latest   ab73c7fd6723   9 days ago      192MB
hello-world     latest   b038788ddb22   3 months ago    9.14kB
sonarqube       latest   8f9f4cb9fe38   4 months ago    679MB
redis           latest   cedd18a74eff   5 months ago    111MB
postgres        9.6      a3268b800968   18 months ago   191MB
redis           4.0      7a8c2384752f   3 years ago     83.5MB
postgres        10.10    d9f83ddda8e4   3 years ago     201MB
Sachins-MacBook-Air:~ sachinaggarwal$ docker image ls
REPOSITORY      TAG      IMAGE ID       CREATED         SIZE
nginx           latest   ab73c7fd6723   9 days ago      192MB
hello-world     latest   b038788ddb22   3 months ago    9.14kB
sonarqube       latest   8f9f4cb9fe38   4 months ago    679MB
redis           latest   cedd18a74eff   5 months ago    111MB
postgres        9.6      a3268b800968   18 months ago   191MB
redis           4.0      7a8c2384752f   3 years ago     83.5MB
postgres        10.10    d9f83ddda8e4   3 years ago     201MB
```

Step 2: Creating a new container

2.1 Create a new container from the nginx image:

sudo docker run -dt -p 81:81 nginx

```
Sachins-MacBook-Air:~ sachinaggarwal$ docker run -d -p 8008:80 nginx
d2fb3d411b8021825edd0bca00c1745902a27c398857e3f257c4867a474ae3c6
```

2.2 List all the running containers to check the newly created container. You can find various details like the port of the container, its time of creation and ID.

sudo docker ps

```
Sachins-MacBook-Air:~ sachinaggarwal$ sudo docker ps                          ]
Password:                                                                      ]
CONTAINER ID    IMAGE      COMMAND                CREATED         STATUS
 PORTS                  NAMES
d2fb3d411b80    nginx      "/docker-entrypoint.…"  6 minutes ago   Up 6 minutes
 0.0.0.0:8008->80/tcp   wonderful_brahmagupta
```

Step 3: Stopping the container

3.1 Use the following command to stop the running container. (You can also us the   container ID to stop the container: sudo docker stop CONTAINER_ID)

sudo docker stop CONTAINER_NAME

```
[Sachins-MacBook-Air:~ sachinaggarwal$ docker stop wonderful_brahmagupta
wonderful_brahmagupta
```

3.2 Use the following command to list all the running containers and verify if the container   has stopped running:

sudo docker ps

3.3 You can start the container again and check the running containers. (You can also us the   container ID to start the container: **sudo docker start CONTAINER_ID)**

sudo docker start CONTAINER_NAME

sudo docker ps

```
[Sachins-MacBook-Air:~ sachinaggarwal$ sudo docker ps                      ]
CONTAINER ID   IMAGE     COMMAND   CREATED   STATUS    PORTS     NAMES
[Sachins-MacBook-Air:~ sachinaggarwal$ sudo docker start wonderful_brahmagupta   ]
wonderful_brahmagupta
[Sachins-MacBook-Air:~ sachinaggarwal$ sudo docker ps                      ]
CONTAINER ID   IMAGE     COMMAND                  CREATED         STATUS
  PORTS                NAMES
d2fb3d411b80   nginx     "/docker-entrypoint.…"   10 minutes ago  Up 5 seconds
  0.0.0.0:8008->80/tcp   wonderful_brahmagupta
```

3.4 To start the container in interactive mode, use the –i and –t options.

sudo docker run -it --name=Test_1 ubuntu

```
Sachins-MacBook-Air:~ sachinaggarwal$ sudo docker run -it --name=Test_1 ubuntu
Unable to find image 'ubuntu:latest' locally
2023/08/25 13:08:08 must use ASL logging (which requires CGO) if running as ro
latest: Pulling from library/ubuntu
db76c1f8aa17: Pull complete
Digest: sha256:ec050c32e4a6085b423d36ecd025c0d3ff00c38ab93a3d71a460ff1c44fa6d7
Status: Downloaded newer image for ubuntu:latest
```

Step 4: Listing all the containers

4.1 Use the below command to list all the containers started and the once which are stopped:

sudo docker ps -a

```
Sachins-MacBook-Air:~ sachinaggarwal$ sudo docker ps -a
CONTAINER ID    IMAGE             COMMAND                CREATED          STATUS                     PORTS
  NAMES
94c32c3f3950    ubuntu            "/bin/bash"            3 minutes ago    Exited (127) 4 seconds ago
  Test_1
d2fb3d411b80    nginx             "/docker-entrypoint.…" 17 minutes ago   Up 7 minutes               0.0.0.0:8008->80/tcp
  wonderful_brahmagupta
09925894260b    nginx             "/docker-entrypoint.…" 20 minutes ago   Exited (0) 19 minutes ago
  fervent_chaum
62532fed85a6    nginx             "/docker-entrypoint.…" 25 minutes ago   Exited (127) 25 minutes ago
  hopeful_sammet
da85402e8753    nginx             "/docker-entrypoint.…" 34 minutes ago   Exited (129) 32 minutes ago
  upbeat_chebyshev
289fb7224861    nginx             "/docker-entrypoint.…" 37 minutes ago   Exited (130) 27 minutes ago
  boring_pike
01818158fa66    hello-world       "/hello"               2 weeks ago      Exited (0) 2 weeks ago
  agitated_agnesi
ce5119befa8c    sonarqube:latest  "/opt/sonarqube/dock…" 4 months ago     Exited (255) 2 weeks ago    0.0.0.0:9000->9000/tcp
  sonarqube
fb0d902b2813    redis:4.0         "docker-entrypoint.s…" 4 months ago     Exited (255) 4 months ago   6379/tcp
  wonderful_lovelace
c0b0bf5969aa    redis             "docker-entrypoint.s…" 4 months ago     Exited (255) 4 months ago   6379/tcp
  compassionate_fermi
f6bcbc743524    redis             "docker-entrypoint.s…" 4 months ago     Exited (255) 4 months ago   6379/tcp
  strange_fermi
eecb98ef9890    postgres:10.10    "docker-entrypoint.s…" 4 months ago     Exited (255) 4 months ago   5432/tcp
  vigilant_ardinghelli
a6e18f34ca15    postgres:9.6      "docker-entrypoint.s…" 4 months ago     Exited (1) 4 months ago
  crazy_burnell
```

4.2 To list the containers by their ID, use the below command
       sudo docker ps -aq

```
Sachins-MacBook-Air:~ sachinaggarwal$ sudo docker ps -aq
94c32c3f3950
d2fb3d411b80
09925894260b
62532fed85a6
da85402e8753
289fb7224861
01818158fa66
ce5119befa8c
fb0d902b2813
c0b0bf5969aa
f6bcbc743524
eecb98ef9890
a6e18f34ca15
```

4.3 To list the total file size of each container, use the below command:

sudo docker ps -s

```
Sachins-MacBook-Air:~ sachinaggarwal$ sudo docker ps -s
CONTAINER ID   IMAGE    COMMAND              CREATED        STATUS       PORTS                 NAMES                 S
IZE
d2fb3d411b80   nginx    "/docker-entrypoint.…" 18 minutes ago Up 8 minutes 0.0.0.0:8008->80/tcp  wonderful_brahmagupta  1
.09kB (virtual 192MB)
```

4.4 To list the latest created containers, use the following command:

sudo docker ps -l

```
Sachins-MacBook-Air:~ sachinaggarwal$ sudo docker ps -l
CONTAINER ID   IMAGE    COMMAND       CREATED        STATUS                    PORTS     NAMES
94c32c3f3950   ubuntu   "/bin/bash"   5 minutes ago  Exited (127) About a minute ago      Test_1
```

Step 5: Deleting the container

5.1 Stop the running container and remove it using the following commands:

sudo docker stop CONTAINER_NAME
sudo docker container rm CONTAINER_NAME

```
Sachins-MacBook-Air:~ sachinaggarwal$ sudo docker stop  wonderful_brahmagupta
wonderful_brahmagupta
Sachins-MacBook-Air:~ sachinaggarwal$ sudo docker conatiner rm  wonderful_brahmagupta
docker: 'conatiner' is not a docker command.
See 'docker --help'
Sachins-MacBook-Air:~ sachinaggarwal$ sudo docker container rm wonderful_brahmagupta
wonderful_brahmagupta
Sachins-MacBook-Air:~ sachinaggarwal$ ▊
```