

**School of Computer Science, Engineering and Applications(SCSEA)**  
**B.C.A. TY (CCSA)**  
**Subject : Containers and Orchestration (P)**

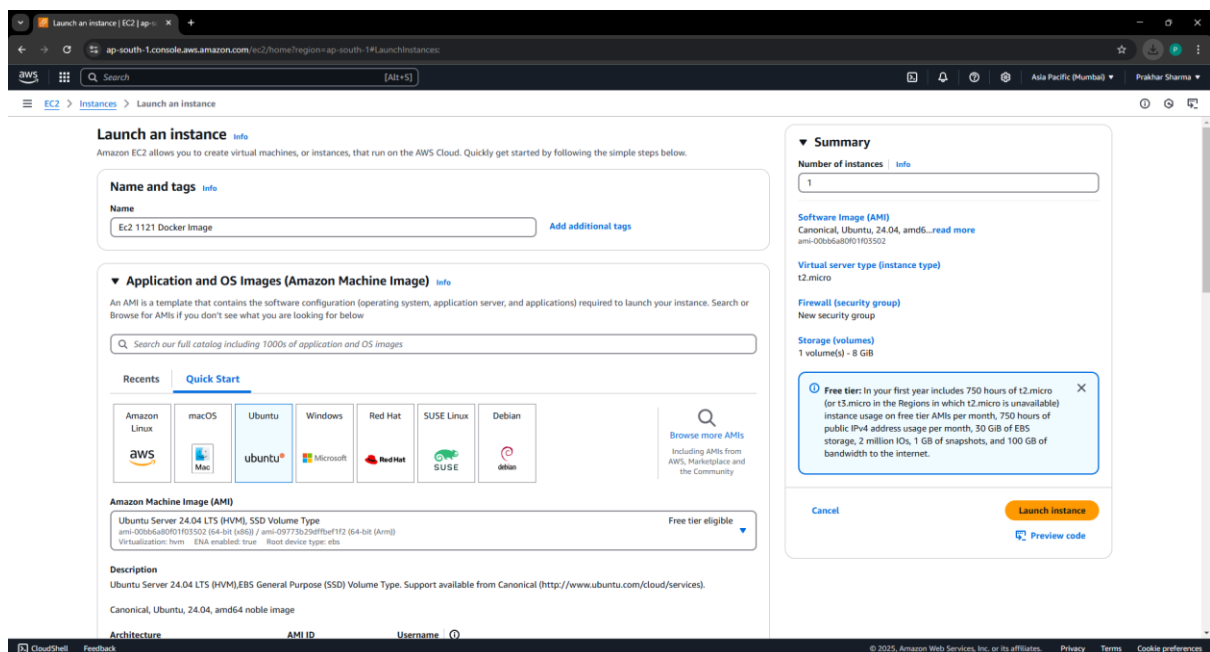
**Name of the Student:**     **Prakhar Anil Sharma**

**PRN: 20220801121**

**Title of Practical:**         **Create and Push a Customized Docker Image to Your User Repository**

Step 1] Make a EC2 Instance and Connect it using SSH Example.

- Name the Instance : Ec2 1121 Docker Image.
- Select Ami image : Ubuntu Server.
- Select Instance type : t2.micro .
- Select or created existing key pair : key 009 .
- Create Security Group .
- Launch the instance .

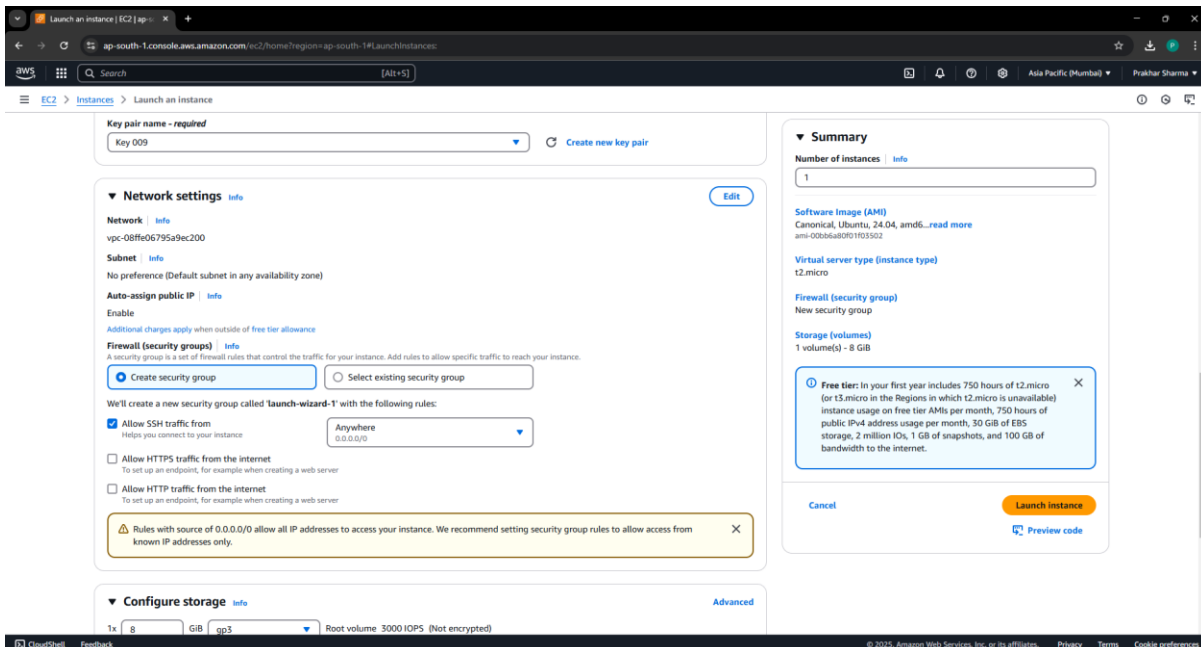
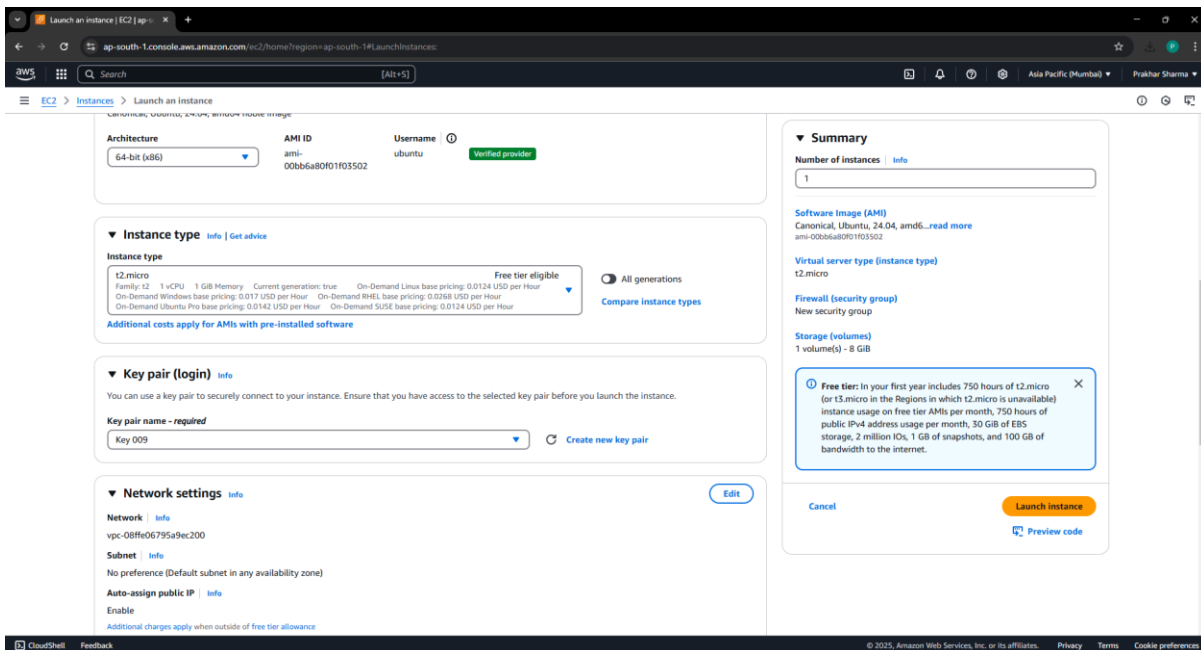


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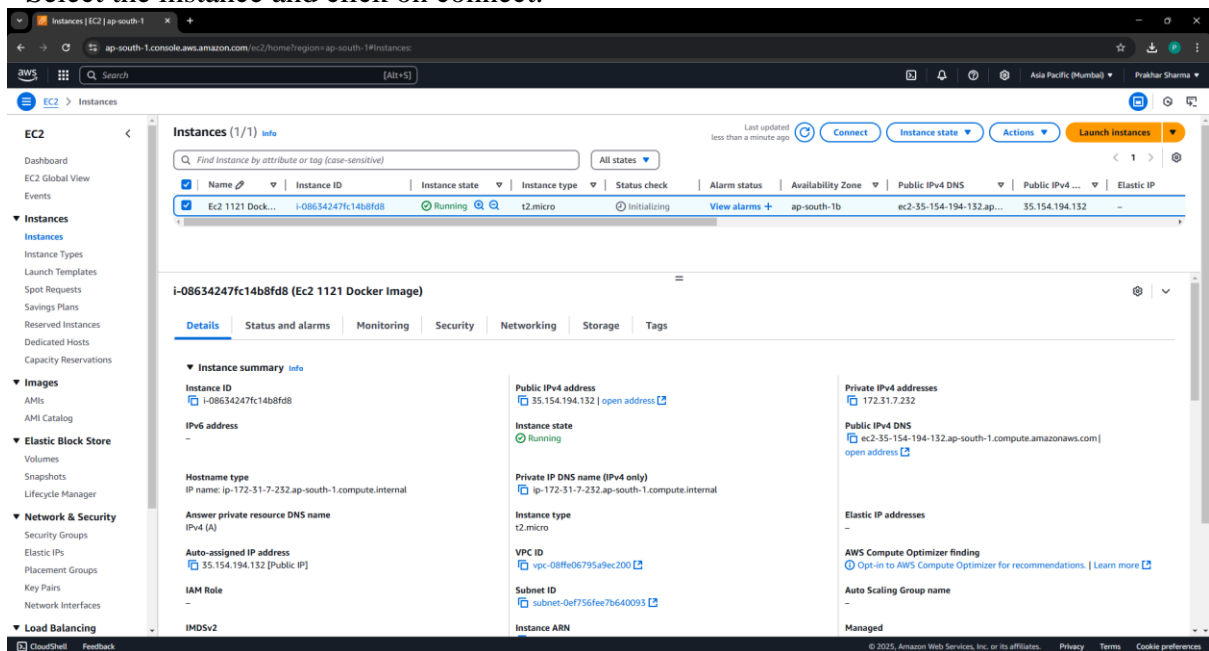
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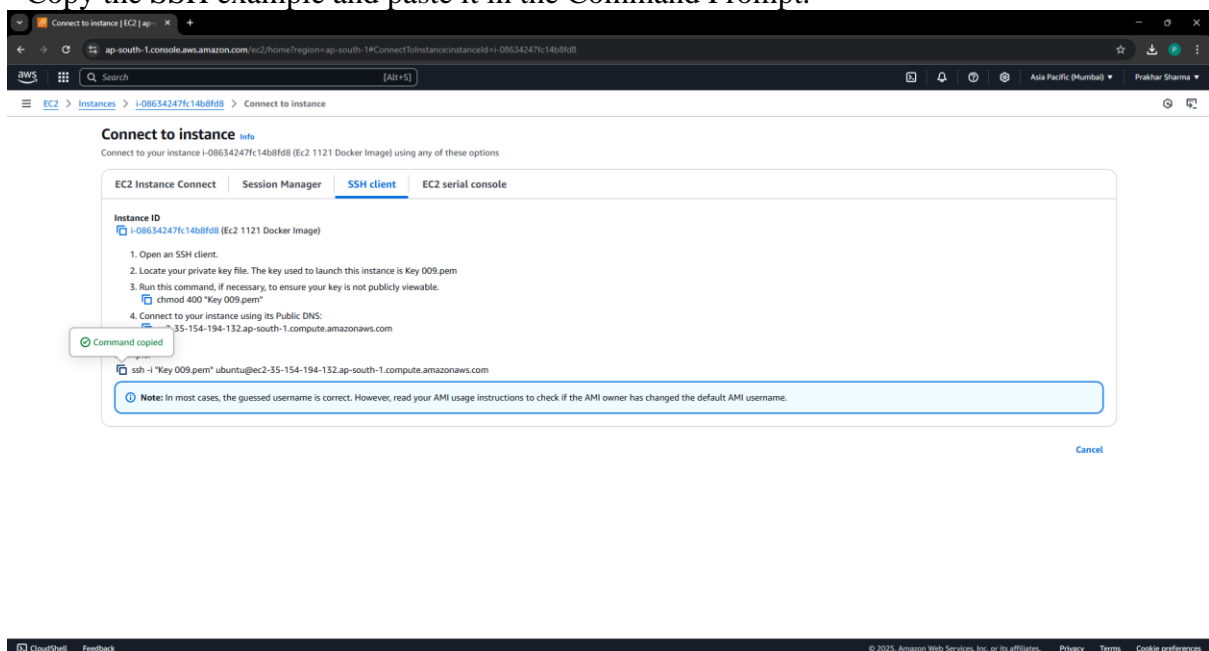
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- Select the instance and click on connect.



- Copy the SSH example and paste it in the Command Prompt.



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```
Microsoft Windows [Version 10.0.26100.3194]
(c) Microsoft Corporation. All rights reserved.

C:\Users\prakh>cd downloads

C:\Users\prakh\Downloads>ssh -i "Key 009.pem" ubuntu@ec2-35-154-194-132.ap-south-1.compute.amazonaws.com
The authenticity of host 'ec2-35-154-194-132.ap-south-1.compute.amazonaws.com (35.154.194.132)' can't be established.
ED25519 key fingerprint is SHA256:51TVImDCV+Zj0K9U6JtwNBcXW6ngp1EPbBLMZ/xLGQ.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'ec2-35-154-194-132.ap-south-1.compute.amazonaws.com' (ED25519) to the list of known hosts.
Welcome to Ubuntu 24.04.1 LTS (GNU/Linux 6.8.0-1021-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:        https://ubuntu.com/pro

System information as of Sun Feb 16 09:22:58 UTC 2025

System load:  0.47          Processes:            109
Usage of /:   24.9% of 6.71GB Users logged in:        0
Memory usage: 21%          IPv4 address for enx0: 172.31.7.232
Swap usage:   0%

Expanded Security Maintenance for Applications is not enabled.
```

Step 2] Now install the docker engine on the ec2 instance by running the following commands :

- sudo -i
- sudo apt-get update && sudo apt-get upgrade -y
- sudo apt install docker.io
- docker -v

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```
root@ip-172-31-7-232: ~
Usage of /: 24.9% of 6.71GB  Users logged in: 0
Memory usage: 21%          IPv4 address for enX0: 172.31.7.232
Swap usage: 0%

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-31-7-232:~$ sudo -i
root@ip-172-31-7-232:~# sudo apt-get update && sudo apt-get upgrade -y

/etc/needrestart/restart.d/dbus.service
systemctl restart getty@tty1.service
systemctl restart networkd-dispatcher.service
systemctl restart serial-getty@ttyS0.service
systemctl restart systemd-logind.service
systemctl restart unattended-upgrades.service

No containers need to be restarted.

User sessions running outdated binaries:
ubuntu @ session #1: sshd[1025,1135]
ubuntu @ user manager service: systemd[1030]

No VM guests are running outdated hypervisor (qemu) binaries on this host.
root@ip-172-31-7-232:~# sudo apt install docker.io -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  bridge-utils containerd dns-root-data dnsmasq-base pigz runc ubuntu-fan
Suggested packages:
  ifupdown aufs-tools cgroupfs-mount | cgroup-lite debootstrap docker-buildx docker-compose-v2 docker-doc
  rinse zfs-fuse | zfsutils
The following NEW packages will be installed:
  bridge-utils containerd dns-root-data dnsmasq-base docker.io pigz runc ubuntu-fan
0 upgraded, 8 newly installed, 0 to remove and 0 not upgraded.
Need to get 78.6 MB of archives.
After this operation, 302 MB of additional disk space will be used.
```

Step 3] Now make a directory and make a dockerfile for image creation using following commands .

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- mkdir prakhar
- cd prakhar
- sudo vi dockerfile

```
root@ip-172-31-7-232: ~/prakhar
Scanning processes...
Scanning candidates...
Scanning linux images...

Running kernel seems to be up-to-date.

Restarting services...

Service restarts being deferred:
/etc/needrestart/restart.d/dbus.service
systemctl restart getty@tty1.service
systemctl restart networkd-dispatcher.service
systemctl restart serial-getty@ttyS0.service
systemctl restart systemd-logind.service
systemctl restart unattended-upgrades.service

No containers need to be restarted.

User sessions running outdated binaries:
ubuntu @ session #1: sshd[1025,1135]
ubuntu @ user manager service: systemd[1030]

No VM guests are running outdated hypervisor (qemu) binaries on this host.
root@ip-172-31-7-232:~# docker -v
Docker version 26.1.3, build 26.1.3-0ubuntu1~24.04.1
root@ip-172-31-7-232:~# mkdir prakhar
root@ip-172-31-7-232:~# cd prakhar
root@ip-172-31-7-232:~/prakhar# sudo vi dockerfile
```

Press I key

Now enter the following code in the vi editor :

# This is a Sample Image

FROM ubuntu

MAINTAINER [prakhar@gmail.com](mailto:prakhar@gmail.com) (your E-mail)

RUN apt-get update

RUN apt-get install -y nginx

CMD ["echo","Image created"]

For saving it press esc :wq and enter



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**Title of Practical:**

```
root@ip-172-31-7-232: ~/pral
# This is a Sample Image

FROM ubuntu
MAINTAINER prakhar@gmail.com
RUN apt-get update
RUN apt-get install -y nginx
CMD ["echo", "Image created"]

:wq
```

Now run below command to build the image  
- `docker build -t prakhar:07(your image name:tag) .`



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**Title of Practical:**         **Create and Push a Customized Docker Image to Your User Repository**

```
root@ip-172-31-7-232: ~/pral
/etc/needrestart/restart.d/dbus.service
systemctl restart getty@tty1.service
systemctl restart networkd-dispatcher.service
systemctl restart serial-getty@ttyS0.service
systemctl restart systemd-logind.service
systemctl restart unattended-upgrades.service

No containers need to be restarted.

User sessions running outdated binaries:
ubuntu @ session #1: sshd[1025,1135]
ubuntu @ user manager service: systemd[1030]

No VM guests are running outdated hypervisor (qemu) binaries on this host.
root@ip-172-31-7-232:~# docker -v
Docker version 26.1.3, build 26.1.3-0ubuntu1~24.04.1
root@ip-172-31-7-232:~# mkdir prakhar
root@ip-172-31-7-232:~# cd prakhar
root@ip-172-31-7-232:~/prakhar# sudo vi dockerfile
root@ip-172-31-7-232:~/prakhar# cat dockerfile
# This is a Sample Image

FROM ubuntu
MAINTAINER prakhar@gmail.com
RUN apt-get update
RUN apt-get install -y nginx
CMD ["echo", "Image created"]
root@ip-172-31-7-232:~/prakhar# docker build -t prakhar:07 .
```

```
root@ip-172-31-7-232:~/prakhar# docker build -t prakhar:07 .
DEPRECATED: The legacy builder is deprecated and will be removed in a future release.
Install the buildx component to build images with BuildKit:
https://docs.docker.com/go/buildx/

Sending build context to Docker daemon 2.048kB
Step 1/5 : FROM ubuntu
latest: Pulling from library/ubuntu
5a7813e071bf: Pull complete
Digest: sha256:72297848456d5d37d1262630108ab308d3e9ec7ed1c3286a32fe09856619a782
Status: Downloaded newer image for ubuntu:latest
--> a04dc4851cbc
Step 2/5 : MAINTAINER prakhar@gmail.com
--> Running in d3a7fd638d53
--> Removed intermediate container d3a7fd638d53
--> 967e942b2ac6
Step 3/5 : RUN apt-get update
--> Running in ed1f09502848
Get:1 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Get:2 http://archive.ubuntu.com/ubuntu noble InRelease [256 kB]
Get:3 http://security.ubuntu.com/ubuntu noble-security/main amd64 Packages [777 kB]
Get:4 http://archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:5 http://archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:6 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Packages [789 kB]
Get:7 http://archive.ubuntu.com/ubuntu noble/main amd64 Packages [1808 kB]
Get:8 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Packages [1039 kB]
Get:9 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Packages [15.5 kB]
Get:10 http://archive.ubuntu.com/ubuntu noble/restricted amd64 Packages [117 kB]
```





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To verify successful image built run  
- docker images

```
root@ip-172-31-7-232: ~/prakhars
debconf: falling back to frontend: Teletype
Setting up nginx (1.24.0-2ubuntu7.1) ...
invoke-rc.d: unknown initscript, /etc/init.d/nginx not found.
invoke-rc.d: could not determine current runlevel
Setting up nginx-common (1.24.0-2ubuntu7.1) ...
debconf: unable to initialize frontend: Dialog
debconf: (TERM is not set, so the dialog frontend is not usable.)
debconf: falling back to frontend: Readline
debconf: unable to initialize frontend: Readline
debconf: (Can't locate Term/ReadLine.pm in @INC (you may need to install the Term::ReadLine module) (@INC entries checked: /etc/perl /usr/local/lib/x86_64-linux-gnu/perl/5.38.2 /usr/local/share/perl/5.38.2 /usr/lib/x86_64-linux-gnu/perl5/5.38 /usr/share/perl5 /usr/lib/x86_64-linux-gnu/perl-base /usr/lib/x86_64-linux-gnu/perl/5.38 /usr/share/perl/5.38 /usr/local/lib/site_perl) at /usr/share/perl5/Debconf/FrontEnd/Readline.pm line 8.)
debconf: falling back to frontend: Teletype
Processing triggers for libc-bin (2.39-0ubuntu8.3) ...
----> Removed intermediate container bf763dcc16c6
----> 81b4a43e0ed2
Step 5/5 : CMD ["echo","Image created"]
----> Running in 5d64bd903f25
----> Removed intermediate container 5d64bd903f25
----> 3ea19c4c2493
Successfully built 3ea19c4c2493
Successfully tagged prakhar:07
root@ip-172-31-7-232:~/prakhars# docker images
REPOSITORY    TAG       IMAGE ID       CREATED        SIZE
prakhar        07        3ea19c4c2493   3 minutes ago  132MB
ubuntu        latest    a04dc4851cbc   2 weeks ago   78.1MB
root@ip-172-31-7-232:~/prakhars#
```

Now to push the image on docker hub login through the command prompt by running following commands and push the image

- docker login

as my first command is not pushed to docker hub I renamed the image and pushed it again with this below command

- docker push prakharsharma007(your username)/prakhardocker:003(your image name:tag)

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```
root@ip-172-31-7-232:~# docker images
ubuntu          latest      a04dc4851cbc 2 weeks ago    78.1MB
root@ip-172-31-7-232:~# docker tag prakhar:07 prakhardocker:003
root@ip-172-31-7-232:~# docker images
REPOSITORY      TAG          IMAGE ID      CREATED        SIZE
prakhar          07           3ea19c4c2493 10 minutes ago 132MB
prakhardocker    003          3ea19c4c2493 10 minutes ago 132MB
ubuntu          latest      a04dc4851cbc 2 weeks ago    78.1MB
root@ip-172-31-7-232:~# docker login
Log in with your Docker ID or email address to push and pull images from Docker Hub. If you don't have a Docker ID, head over to https://hub.docker.com/ to create one.
You can log in with your password or a Personal Access Token (PAT). Using a limited-scope PAT grants better security and is required for organizations using SSO. Learn more at https://docs.docker.com/go/access-tokens/

Username: prakharsharma007
Password:
WARNING! Your password will be stored unencrypted in /root/.docker/config.json.
Configure a credential helper to remove this warning. See
https://docs.docker.com/engine/reference/commandline/login/#credentials-store

Login Succeeded
root@ip-172-31-7-232:~# docker push prakharsharma007/prakhardocker:003
The push refers to repository [docker.io/prakharsharma007/prakhardocker]
An image does not exist locally with the tag: prakharsharma007/prakhardocker
root@ip-172-31-7-232:~# docker push prakharsharma007/prakhardocker
Using default tag: latest
The push refers to repository [docker.io/prakharsharma007/prakhardocker]
An image does not exist locally with the tag: prakharsharma007/prakhardocker
root@ip-172-31-7-232:~#
```

```
root@ip-172-31-7-232:~# docker images
REPOSITORY      TAG          IMAGE ID      CREATED        SIZE
prakhar          07           3ea19c4c2493 28 minutes ago 132MB
prakhardocker    003          3ea19c4c2493 28 minutes ago 132MB
ubuntu          latest      a04dc4851cbc 2 weeks ago    78.1MB
root@ip-172-31-7-232:~# docker tag prakhardocker:003 prakharsharma007/prakhardocker:003
root@ip-172-31-7-232:~# docker images
REPOSITORY      TAG          IMAGE ID      CREATED        SIZE
prakhar          07           3ea19c4c2493 30 minutes ago 132MB
prakhardocker    003          3ea19c4c2493 30 minutes ago 132MB
prakharsharma007/prakhardocker 003          3ea19c4c2493 30 minutes ago 132MB
ubuntu          latest      a04dc4851cbc 2 weeks ago    78.1MB
root@ip-172-31-7-232:~# docker login
Authenticating with existing credentials...
WARNING! Your password will be stored unencrypted in /root/.docker/config.json.
Configure a credential helper to remove this warning. See
https://docs.docker.com/engine/reference/commandline/login/#credentials-store

Login Succeeded
root@ip-172-31-7-232:~# docker push prakharsharma007/prakhardocker:003
The push refers to repository [docker.io/prakharsharma007/prakhardocker]
665da36d9385: Pushed
fa3f87ca90f0: Pushed
4b7c01ed0534: Mounted from library/ubuntu
003: digest: sha256:7fd7da64645a1b42e49e95c5377fa8c510771caaa5d18e57de9e0b3a12873f19 size: 952
root@ip-172-31-7-232:~#
```

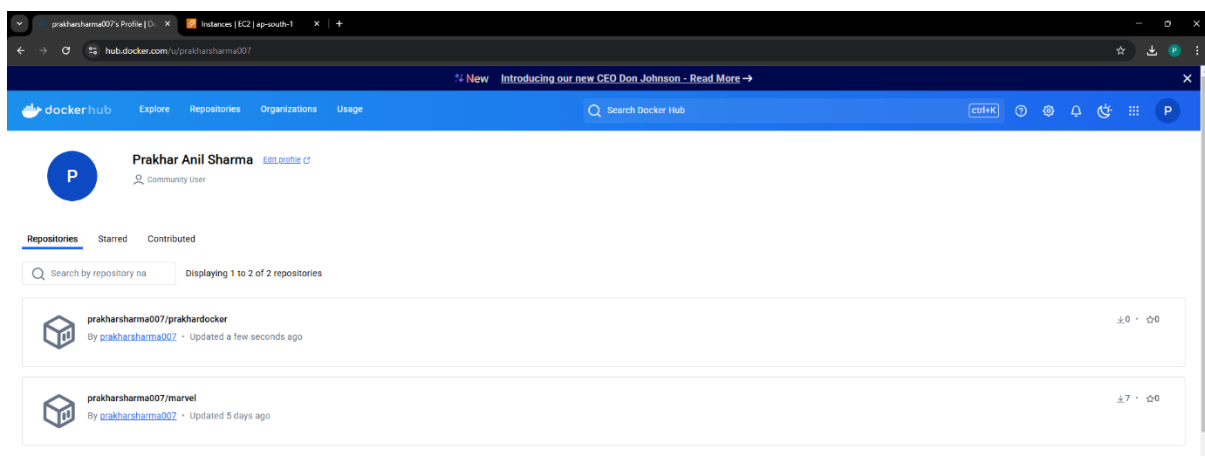
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Now go to your docker hub my profile page to see your image is successful pushed to docker hub



Now remove all docker images using the following command

- docker rmi prakhar:007 (your image name)

After removing all run the below command to check that all images removed successfully

- docker images

You will see there is not a single image remaining



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```
root@ip-172-31-7-232:~/prakh# docker images
REPOSITORY          TAG             IMAGE ID        CREATED         SIZE
prakhardocker        003             3ea19c4c2493    34 minutes ago  132MB
prakharsharma007/prakhardocker  003             3ea19c4c2493    34 minutes ago  132MB
ubuntu               latest          a04dc4851cbc    2 weeks ago     78.1MB
root@ip-172-31-7-232:~/prakh# docker rmi prakhardocker:003
Untagged: prakhardocker:003
root@ip-172-31-7-232:~/prakh# docker rmi prakharsharma007/prakhardocker:003
Untagged: prakharsharma007/prakhardocker:003
Untagged: prakharsharma007/prakhardocker@sha256:7fd7da64645a1b42e49e95c5377fa8c510771caaa5d18e57de9e0b3a12873f19
Deleted: sha256:3ea19c4c2493bbd9f120697f0f0e031f8f7a0e87473a3cc79f3c755f4fff2a02
Deleted: sha256:81b4a43e0ed2b82d96ef3981e69498f360cbbb5b79901a82bfb43f2c64374f5
Deleted: sha256:f558ba4adb46ad93bac571120ef069e54d0808f18fae30347da174fe139392dd
Deleted: sha256:69dc03b65f1915f510b0a382c5be37dbaa07ef1da52d4689b4045c61dcccdf18
Deleted: sha256:4f876ffeea9ea2e72b5e188cb6676c0f9ba4ba3a1e0a33495c9d2d69ccba81b
Deleted: sha256:967e942b2ac6f65168a5459ebab032a19067cf6a9a8669834b3ac6b1db8bca63
root@ip-172-31-7-232:~/prakh# docker images
REPOSITORY          TAG             IMAGE ID        CREATED         SIZE
ubuntu               latest          a04dc4851cbc    2 weeks ago     78.1MB
root@ip-172-31-7-232:~/prakh# docker rmi ubuntu:latest
Untagged: ubuntu:latest
Untagged: ubuntu@sha256:72297848456d5d37d1262630108ab308d3e9ec7ed1c3286a32fe09856619a782
Deleted: sha256:a04dc4851cbcb42b54d1f52a41f5f9eca6a5fd03748c3f6eb2cbeb238ca99bd
Deleted: sha256:4b7c01ed0534d4f9be9cf97d068da1598c6c20b26cb134fad066defdb6d541d
root@ip-172-31-7-232:~/prakh# docker images
REPOSITORY          TAG             IMAGE ID        CREATED         SIZE
root@ip-172-31-7-232:~/prakh#
```