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Batch-5

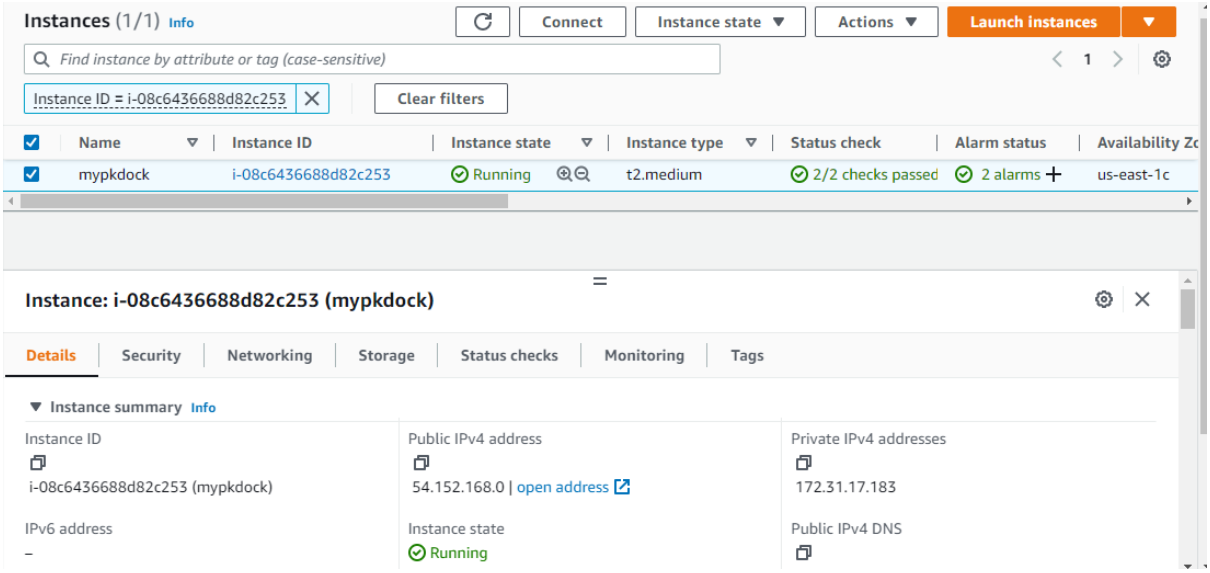
Sprint-5 (IAC)

Docker - Day 3

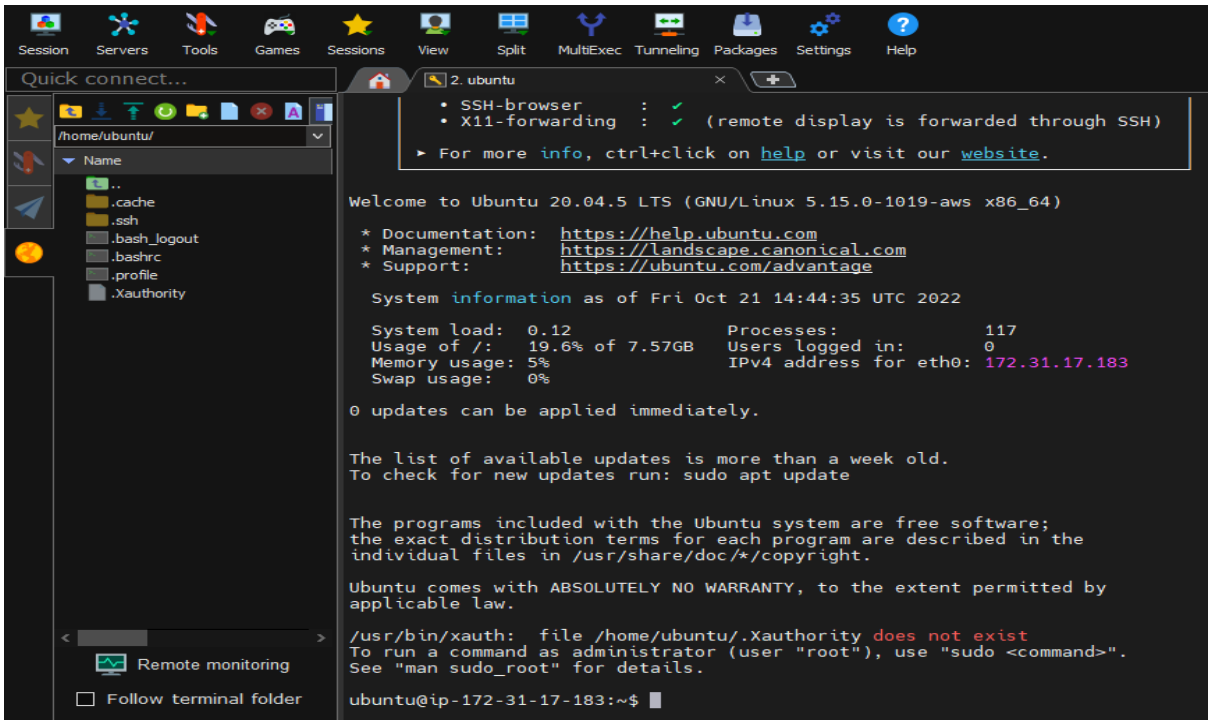
Q: Write steps to install docker, also write the commands and execute those commands in MobaXterm.

Answer:

Step: First we will create an EC2 instance named as “mypkdock”.



Step: Next we will create a session use our public ip address of our ec2 machine in our session:



Step: we will write “$ sudo -i” to make our docker route user.

Step: Next, we will add user by writing “adduser docker” and created a docker folder:

```
ubuntu@ip-172-31-17-183:~$ sudo -i
root@ip-172-31-17-183:~#
root@ip-172-31-17-183:~# adduser docker
Adding user `docker' ...
Adding new group `docker' (1001) ...
Adding new user `docker' (1001) with group `docker' ...
Creating home directory `/home/docker' ...
Copying files from `/etc/skel' ...
New password:
Retype new password:
passwd: password updated successfully
Changing the user information for docker
Enter the new value, or press ENTER for the default
        Full Name []: parneet docker
        Room Number []: 2
        Work Phone []:
        Home Phone []:
        Other []:
Is the information correct? [Y/n] y
root@ip-172-31-17-183:~#
```

Step: Now we will give our root permission “vi /etc/sudoers.

Step: Now we can check our permissions assigned using “cat /etc/sudoers:

```
root@ip-172-31-17-183:~# vi /etc/sudoers
root@ip-172-31-17-183:~# cat /etc/sudoer
cat: /etc/sudoer: No such file or directory
root@ip-172-31-17-183:~# cat /etc/sudoers
#
# This file MUST be edited with the 'visudo' command as root.
#
# Please consider adding local content in /etc/sudoers.d/ instead of
# directly modifying this file.
#
# See the man page for details on how to write a sudoers file.
#
Defaults        env_reset
Defaults        mail_badpass
Defaults        secure_path="/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/snap/bin"

# Host alias specification

# User alias specification

# Cmnd alias specification

# User privilege specification
root ALL=(ALL:ALL) ALL
docker ALL=(ALL:ALL) ALL

# Members of the admin group may gain root privileges
%admin ALL=(ALL) ALL

# Allow members of group sudo to execute any command
%sudo   ALL=(ALL:ALL) ALL

# See sudoers(5) for more information on "#include" directives:

#includedir /etc/sudoers.d
```

Step: We will go in our docker folder “su docker”:

```
root@ip-172-31-17-183:~# su docker
docker@ip-172-31-17-183:/root$
```

Step: First we will install using the repository

1. Next, we will Update the apt package index and install packages to allow apt to use a repository over https:

   $ sudo apt-get update:

```
root@ip-172-31-17-183:~# su docker
docker@ip-172-31-17-183:/root$ sudo apt-get update
[sudo] password for docker:
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal InRelease
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-backports InRelease [108 kB]
Get:4 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal/universe amd64 Packages [8628 kB]
Get:6 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal/universe Translation-en [5124 kB]
Get:7 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal/universe amd64 c-n-f Metadata [265 kB]
Get:8 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal/multiverse amd64 Packages [144 kB]
Get:9 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal/multiverse Translation-en [104 kB]
Get:10 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal/multiverse amd64 c-n-f Metadata [9136 B]
Get:11 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-updates/main amd64 Packages [2191 kB]
Get:12 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-updates/main Translation-en [385 kB]
Get:13 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-updates/main amd64 c-n-f Metadata [16.0 kB]
Get:14 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-updates/restricted amd64 Packages [1367 kB]
Get:15 http://security.ubuntu.com/ubuntu focal-security/main amd64 Packages [1819 kB]
Get:16 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-updates/restricted Translation-en [193 kB]
Get:17 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-updates/restricted amd64 c-n-f Metadata [592 B]
Get:18 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-updates/universe amd64 Packages [970 kB]
Get:19 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-updates/universe Translation-en [221 kB]
Get:20 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-updates/universe amd64 c-n-f Metadata [21.8 kB]
Get:21 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-updates/multiverse amd64 Packages [24.4 kB]
Get:22 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-updates/multiverse Translation-en [7316 B]
Get:23 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-updates/multiverse amd64 c-n-f Metadata [588 B]
Get:24 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-backports/main amd64 Packages [45.6 kB]
Get:25 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-backports/main Translation-en [16.3 kB]
Get:26 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-backports/main amd64 c-n-f Metadata [1420 B]
Get:27 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-backports/restricted amd64 c-n-f Metadata [116 B]
Get:28 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-backports/universe amd64 Packages [23.9 kB]
Get:29 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-backports/universe Translation-en [16.0 kB]
Get:30 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-backports/universe amd64 c-n-f Metadata [860 B]
Get:31 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-backports/multiverse amd64 c-n-f Metadata [116 B]
Get:32 http://security.ubuntu.com/ubuntu focal-security/main Translation-en [300 kB]
Get:33 http://security.ubuntu.com/ubuntu focal-security/main amd64 c-n-f Metadata [11.2 kB]
Get:34 http://security.ubuntu.com/ubuntu focal-security/restricted amd64 Packages [1277 kB]
Get:35 http://security.ubuntu.com/ubuntu focal-security/restricted Translation-en [181 kB]
```

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

```
docker@ip-172-31-17-183:/root$ 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 (20211016~20.04.1).
ca-certificates set to manually installed.
curl is already the newest version (7.68.0-1ubuntu2.13).
curl set to manually installed.
gnupg is already the newest version (2.2.19-3ubuntu2.2).
gnupg set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 44 not upgraded.
docker@ip-172-31-17-183:/root$
```

2. Now, we will add docker's official GPG key:

   $ sudo mkdir -p /etc/apt/keyrings
   $ curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo gpg --dearmor -o /etc/apt/keyrings/docker.gpg

```
docker@ip-172-31-17-183:/root$ sudo mkdir -p /etc/apt/keyrings
docker@ip-172-31-17-183:/root$ curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo gpg --dearmor -o /etc/apt/keyrings/docker.g
pg
```

3. Next, we will setup repository:

   $ 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

```
docker@ip-172-31-17-183:/root$ 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
```

Step: We will install Docker Engine:

1. Update the apt package index:
   $ sudo apt-get update

```
docker@ip-172-31-17-183:/root$ sudo apt-get update
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal InRelease
Hit:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-updates InRelease
Hit:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal-backports InRelease
Get:4 https://download.docker.com/linux/ubuntu focal InRelease [57.7 kB]
Hit:5 http://security.ubuntu.com/ubuntu focal-security InRelease
Get:6 https://download.docker.com/linux/ubuntu focal/stable amd64 Packages [19.8 kB]
Fetched 77.5 kB in 0s (177 kB/s)
Reading package lists... Done
docker@ip-172-31-17-183:/root$
```

2. Install Docker Engine, container, and Docker Compose.
   $ sudo apt-get install docker-ce docker-ce-cli containerd.io docker-compose-plugin

```
docker@ip-172-31-17-183:/root$ sudo apt-get install docker-ce docker-ce-cli containerd.io docker-compose-plugin
Reading package lists ... Done
Building dependency tree
Reading state information ... Done
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-ce docker-ce-cli docker-ce-rootless-extras docker-compose-plugin docker-scan-plugin pigz slirp4netns
0 upgraded, 8 newly installed, 0 to remove and 44 not upgraded.
Need to get 112 MB of archives.
After this operation, 442 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal/universe amd64 pigz amd64 2.4-1 [57.4 kB]
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu focal/universe amd64 slirp4netns amd64 0.4.3-1 [74.3 kB]
Get:3 https://download.docker.com/linux/ubuntu focal/stable amd64 containerd.io amd64 1.6.8-1 [28.1 MB]
Get:4 https://download.docker.com/linux/ubuntu focal/stable amd64 docker-ce-cli amd64 5:20.10.20~3-0~ubuntu-focal [41.5 MB]
Get:5 https://download.docker.com/linux/ubuntu focal/stable amd64 docker-ce amd64 5:20.10.20~3-0~ubuntu-focal [20.5 MB]
Get:6 https://download.docker.com/linux/ubuntu focal/stable amd64 docker-ce-rootless-extras amd64 5:20.10.20~3-0~ubuntu-focal [8395 kB]
Get:7 https://download.docker.com/linux/ubuntu focal/stable amd64 docker-compose-plugin amd64 2.12.0~ubuntu-focal [9565 kB]
Get:8 https://download.docker.com/linux/ubuntu focal/stable amd64 docker-scan-plugin amd64 0.17.0~ubuntu-focal [3521 kB]
Fetched 112 MB in 8s (13.5 MB/s)
Selecting previously unselected package pigz.
(Reading database ... 61718 files and directories currently installed.)
Preparing to unpack .../0-pigz_2.4-1_amd64.deb ...
Unpacking pigz (2.4-1) ...
Selecting previously unselected package containerd.io.
Preparing to unpack .../1-containerd.io_1.6.8-1_amd64.deb ...
Unpacking containerd.io (1.6.8-1) ...
Selecting previously unselected package docker-ce-cli.
Preparing to unpack .../2-docker-ce-cli_5%3a20.10.20~3-0~ubuntu-focal_amd64.deb ...
Unpacking docker-ce-cli (5:20.10.20~3-0~ubuntu-focal) ...
Selecting previously unselected package docker-ce.
```

```
Preparing to unpack .../0-pigz_2.4-1_amd64.deb ...
Unpacking pigz (2.4-1) ...
Selecting previously unselected package containerd.io.
Preparing to unpack .../1-containerd.io_1.6.8-1_amd64.deb ...
Unpacking containerd.io (1.6.8-1) ...
Selecting previously unselected package docker-ce-cli.
Preparing to unpack .../2-docker-ce-cli_5%3a20.10.20~3-0~ubuntu-focal_amd64.deb ...
Unpacking docker-ce-cli (5:20.10.20~3-0~ubuntu-focal) ...
Selecting previously unselected package docker-ce.
Preparing to unpack .../3-docker-ce_5%3a20.10.20~3-0~ubuntu-focal_amd64.deb ...
Unpacking docker-ce (5:20.10.20~3-0~ubuntu-focal) ...
Selecting previously unselected package docker-ce-rootless-extras.
Preparing to unpack .../4-docker-ce-rootless-extras_5%3a20.10.20~3-0~ubuntu-focal_amd64.deb ...
Unpacking docker-ce-rootless-extras (5:20.10.20~3-0~ubuntu-focal) ...
Selecting previously unselected package docker-compose-plugin.
Preparing to unpack .../5-docker-compose-plugin_2.12.0~ubuntu-focal_amd64.deb ...
Unpacking docker-compose-plugin (2.12.0~ubuntu-focal) ...
Selecting previously unselected package docker-scan-plugin.
Preparing to unpack .../6-docker-scan-plugin_0.17.0~ubuntu-focal_amd64.deb ...
Unpacking docker-scan-plugin (0.17.0~ubuntu-focal) ...
Selecting previously unselected package slirp4netns.
Preparing to unpack .../7-slirp4netns_0.4.3-1_amd64.deb ...
Unpacking slirp4netns (0.4.3-1) ...
Setting up slirp4netns (0.4.3-1) ...
Setting up docker-scan-plugin (0.17.0~ubuntu-focal) ...
Setting up containerd.io (1.6.8-1) ...
Created symlink /etc/systemd/system/multi-user.target.wants/containerd.service → /lib/systemd/system/containerd.service.
Setting up docker-compose-plugin (2.12.0~ubuntu-focal) ...
Setting up docker-ce-cli (5:20.10.20~3-0~ubuntu-focal) ...
Setting up pigz (2.4-1) ...
Setting up docker-ce-rootless-extras (5:20.10.20~3-0~ubuntu-focal) ...
Setting up docker-ce (5:20.10.20~3-0~ubuntu-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 (245.4-4ubuntu3.17) ...
```

Step: Next we will run some commands like:

1. To check docker version only “$ docker --version”:

```
docker@ip-172-31-17-183:/root$ docker --version
Docker version 20.10.20, build 9fdeb9c
```

2. To check docker version and other information like about the engine etc “docker version”:

```
docker@ip-172-31-17-183:/root$ docker version
Client: Docker Engine - Community
 Version:           20.10.20
 API version:       1.41
 Go version:        go1.18.7
 Git commit:        9fdeb9c
 Built:             Tue Oct 18 18:20:23 2022
 OS/Arch:           linux/amd64
 Context:           default
 Experimental:      true

Server: Docker Engine - Community
 Engine:
  Version:          20.10.20
  API version:      1.41 (minimum version 1.12)
  Go version:       go1.18.7
  Git commit:       03df974
  Built:            Tue Oct 18 18:18:12 2022
  OS/Arch:          linux/amd64
  Experimental:     false
 containerd:
  Version:          1.6.8
  GitCommit:        9cd3357b7fd7218e4aec3eae239db1f68a5a6ec6
 runc:
  Version:          1.1.4
  GitCommit:        v1.1.4-0-g5fd4c4d
 docker-init:
  Version:          0.19.0
  GitCommit:        de40ad0
docker@ip-172-31-17-183:/root$
```

3. To get proper information about the docker client etc we use “docker info”:

```
docker@ip-172-31-17-183:/root$ docker info
Client:
 Context:    default
 Debug Mode: false
 Plugins:
  app: Docker App (Docker Inc., v0.9.1-beta3)
  buildx: Docker Buildx (Docker Inc., v0.9.1-docker)
  compose: Docker Compose (Docker Inc., v2.12.0)
  scan: Docker Scan (Docker Inc., v0.17.0)

Server:
 Containers: 0
  Running: 0
  Paused: 0
  Stopped: 0
 Images: 0
 Server Version: 20.10.20
 Storage Driver: overlay2
  Backing Filesystem: extfs
  Supports d_type: true
  Native Overlay Diff: true
  userxattr: false
 Logging Driver: json-file
 Cgroup Driver: cgroupfs
 Cgroup Version: 1
 Plugins:
  Volume: local
  Network: bridge host ipvlan macvlan null overlay
  Log: awslogs fluentd gcplogs gelf journald json-file local logentries splunk syslog
 Swarm: inactive
 Runtimes: runc io.containerd.runc.v2 io.containerd.runtime.v1.linux
 Default Runtime: runc
 Init Binary: docker-init
 containerd version: 9cd3357b7fd7218e4aec3eae239db1f68a5a6ec6
 runc version: v1.1.4-0-g5fd4c4d
 init version: de40ad0
```

4. To get help in command line we use “$ docker help”:

```
docker@ip-172-31-17-183:/root$ docker help

Usage:  docker [OPTIONS] COMMAND

A self-sufficient runtime for containers

Options:
      --config string      Location of client config files (default "/home/docker/.docker")
  -c, --context string     Name of the context to use to connect to the daemon (overrides DOCKER_HOST env var and default context
                           set with "docker context use")
  -D, --debug              Enable debug mode
  -H, --host list          Daemon socket(s) to connect to
  -l, --log-level string   Set the logging level ("debug"|"info"|"warn"|"error"|"fatal") (default "info")
      --tls                Use TLS; implied by --tlsverify
      --tlscacert string   Trust certs signed only by this CA (default "/home/docker/.docker/ca.pem")
      --tlscert string     Path to TLS certificate file (default "/home/docker/.docker/cert.pem")
      --tlskey string      Path to TLS key file (default "/home/docker/.docker/key.pem")
      --tlsverify          Use TLS and verify the remote
  -v, --version            Print version information and quit

Management Commands:
  app*        Docker App (Docker Inc., v0.9.1-beta3)
  builder     Manage builds
  buildx*     Docker Buildx (Docker Inc., v0.9.1-docker)
  compose*    Docker Compose (Docker Inc., v2.12.0)
  config      Manage Docker configs
  container   Manage containers
  context     Manage contexts
  image       Manage images
  manifest    Manage Docker image manifests and manifest lists
  network     Manage networks
  node        Manage Swarm nodes
  plugin      Manage plugins
  scan*       Docker Scan (Docker Inc., v0.17.0)
  secret      Manage Docker secrets
  service     Manage services
  stack       Manage Docker stacks
```

5. To login in our docker hub we use “$ docker login”:

```
docker@ip-172-31-17-183:/root$ docker login
Login with your Docker ID 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.
Username: parneet1703
Password:
WARNING! Your password will be stored unencrypted in /home/docker/.docker/config.json.
Configure a credential helper to remove this warning. See
https://docs.docker.com/engine/reference/commandline/login/#credentials-store

Login Succeeded
```

6. To add an image to our machine we use “$ docker run imagename” like “$ docker run mysql”:

```
docker@ip-172-31-17-183:/root$ docker run mysql
Unable to find image 'mysql:latest' locally
latest: Pulling from library/mysql
5ed150ed0abe: Pull complete
0fede58e17ac: Pull complete
994a6ddd6efe: Pull complete
028bda79779b: Pull complete
426fbe9e56a2: Pull complete
1a00e58dd193: Pull complete
4a4f64494005: Pull complete
fba8ab3534a7: Pull complete
2695938edf88: Pull complete
bd31bed30a0c: Pull complete
b52042432ab3: Pull complete
Digest: sha256:12bae50f531fef9dc7726072446cd7c4b461eaa154611659c891a0d9f628684f
Status: Downloaded newer image for mysql:latest
2022-10-21 16:39:40+00:00 [Note] [Entrypoint]: Entrypoint script for MySQL Server 8.0.31-1.el8 started.
2022-10-21 16:39:40+00:00 [Note] [Entrypoint]: Switching to dedicated user 'mysql'
2022-10-21 16:39:40+00:00 [Note] [Entrypoint]: Entrypoint script for MySQL Server 8.0.31-1.el8 started.
2022-10-21 16:39:40+00:00 [ERROR] [Entrypoint]: Database is uninitialized and password option is not specified
    You need to specify one of the following as an environment variable:
    - MYSQL_ROOT_PASSWORD
    - MYSQL_ALLOW_EMPTY_PASSWORD
    - MYSQL_RANDOM_ROOT_PASSWORD
```

7. To know about image of our machine we use “$ docker images”:

```
docker@ip-172-31-17-183:/root$ docker images
REPOSITORY   TAG       IMAGE ID       CREATED         SIZE
mysql        latest    6cc1a43ad84d   45 hours ago    535MB
docker@ip-172-31-17-183:/root$
```

8. To forcefully remove the image, form our machine use “$ docker rmi -f image name: