



Inspiring Excellence

CSE484(Cloud Computing) Assignment 3: Light Container

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*Some requirements that is needed to start the next steps

OS requirements

To install Docker Engine, you need the 64-bit version of one of these Ubuntu versions:

- Ubuntu Mantic 23.10
- Ubuntu Jammy 22.04 (LTS)
- Ubuntu Focal 20.04 (LTS)

Docker Engine for Ubuntu is compatible with x86_64 (or amd64), armhf, arm64, s390x, and ppc64le (ppc64el) architectures.



: I am using mac air m1 chip which architecture is arm64.

1.install Docker:

Run the following command to uninstall all conflicting packages which can hamper the installation process :

```
for pkg in docker.io docker-doc docker-compose docker-compose-v2 podman-docker  
containerd runc; do sudo apt-get remove $pkg; done
```

```
habibun@hemel-22241042:~$ for pkg in docker.io docker-doc docker-compose docker-compose-v2 podman-docker containerd runc; do sudo apt-get remove $pkg; done
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Package 'docker.io' is not installed, so not removed
0 upgraded, 0 newly installed, 0 to remove and 62 not upgraded.
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Package 'docker-doc' is not installed, so not removed
0 upgraded, 0 newly installed, 0 to remove and 62 not upgraded.
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Package 'docker-compose' is not installed, so not removed
0 upgraded, 0 newly installed, 0 to remove and 62 not upgraded.
Reading package lists... Done
```

There are numerous ways to install the docker. Using the apt repository, you will now accomplish this. Docker Engine must be installed on a new host system first, and you must configure the Docker repository. You can then install and update Docker using the repository. Configure the apt repository for Docker:

```
# Add Docker's official GPG key:
sudo apt-get update
sudo apt-get install ca-certificates curl
sudo install -m 0755 -d /etc/apt/keyrings
sudo curl -fsSL https://download.docker.com/linux/ubuntu/gpg -o /etc/apt/keyrings/docker.asc
sudo chmod a+r /etc/apt/keyrings/docker.asc

# Add the repository to Apt sources:
echo \
"deb [arch=$(dpkg --print-architecture) signed-by=/etc/apt/keyrings/docker.asc]
https://download.docker.com/linux/ubuntu \
$(. /etc/os-release && echo "$VERSION_CODENAME") stable" | \
sudo tee /etc/apt/sources.list.d/docker.list > /dev/null
sudo apt-get update
```

```
0 upgraded, 0 newly installed, 0 to remove and 62 not upgraded.  
habibun@hemel-22241042:~$ # Add Docker's official GPG key:  
sudo apt-get update  
sudo apt-get install ca-certificates curl  
sudo install -m 0755 -d /etc/apt/keyrings  
sudo curl -fsSL https://download.docker.com/linux/ubuntu/gpg -o /etc/apt/keyrings/docker.asc  
sudo chmod a+r /etc/apt/keyrings/docker.asc  
  
# Add the repository to Apt sources:  
echo \  
  "deb [arch=$(dpkg --print-architecture) signed-by=/etc/apt/keyrings/docker.asc]  
] https://download.docker.com/linux/ubuntu \  
  $(. /etc/os-release && echo "$VERSION_CODENAME") stable" | \  
  sudo tee /etc/apt/sources.list.d/docker.list > /dev/null  
sudo apt-get update  
Get:1 file:/cdrom jammy InRelease  
Ign:1 file:/cdrom jammy InRelease  
Get:2 file:/cdrom jammy Release  
Err:2 file:/cdrom jammy Release  
  File not found - /cdrom/dists/jammy/Release (2: No such file or directory)  
Hit:3 http://ports.ubuntu.com/ubuntu-ports jammy InRelease  
Hit:4 https://download.docker.com/linux/ubuntu focal InRelease
```

*Install the Docker packages. To install the latest version, run:

```
sudo apt-get install docker-ce docker-ce-cli containerd.io docker-buildx-plugin  
docker-compose-plugin
```

```
habibun@hemel-22241042:~$ sudo apt-get install docker-ce docker-ce-cli containerd.io docker-buildx-plugin docker-compose-plugin  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
The following additional packages will be installed:  
  docker-ce-rootless-extras libslirp0 pigz slirp4netns  
Suggested packages:  
  cgroupfs-mount | cgroup-lite  
The following NEW packages will be installed:
```

Make sure you are about to install from the Docker repo instead of the default Ubuntu repo:

```
apt-cache policy docker-ce
```

```
habibun@hemel-22241042:~$ apt-cache policy docker-ce
docker-ce:
  Installed: 5:26.0.0-1~ubuntu.22.04~jammy
  Candidate: 5:26.0.0-1~ubuntu.22.04~jammy
  Version table:
*** 5:26.0.0-1~ubuntu.22.04~jammy 500
      500 https://download.docker.com/linux/ubuntu jammy/stable arm64 Packages
      100 /var/lib/dpkg/status
  5:25.0.5-1~ubuntu.22.04~jammy 500
      500 https://download.docker.com/linux/ubuntu jammy/stable arm64 Packages
```

Verify that the Docker Engine installation is successful by running the hello-world image.

```
sudo service docker start
sudo docker run hello-world
```

```
habibun@hemel-22241042:~$ sudo service docker start
sudo docker run hello-world
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
478afc919002: Pull complete
Digest: sha256:53641cd209a4fecfc68e21a99871ce8c6920b2e7502df0a20671c6fccc73a7c6
Status: Downloaded newer image for hello-world:latest

Hello from Docker!
This message shows that your installation appears to be working correctly.
```

Docker should now be installed, the daemon started, and the process enabled to start on boot. Check that it's running:

```
sudo systemctl status docker
```

```
habibun@hemel-22241042:~$ sudo systemctl status docker
● docker.service - Docker Application Container Engine
  Loaded: loaded (/lib/systemd/system/docker.service; enabled; vendor preset:>
  Active: active (running) since Thu 2024-03-21 15:40:47 UTC; 2min 7s ago
    TriggeredBy: ● docker.socket
    Docs: https://docs.docker.com
   Main PID: 22089 (dockerd)
     Tasks: 10
    Memory: 33.6M
      CPU: 640ms
     CGroup: /system.slice/docker.service
             └─22089 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/con>
Mar 21 15:40:46 hemel-22241042 dockerd[22089]: time="2024-03-21T15:40:46.946268>
Mar 21 15:40:46 hemel-22241042 dockerd[22089]: time="2024-03-21T15:40:46.947626>
Mar 21 15:40:47 hemel-22241042 dockerd[22089]: time="2024-03-21T15:40:47.046968>
Mar 21 15:40:47 hemel-22241042 dockerd[22089]: time="2024-03-21T15:40:47.323974>
Mar 21 15:40:47 hemel-22241042 dockerd[22089]: time="2024-03-21T15:40:47.384493>
```

2.Basic docker commands:

1. We can check the configuration of the Docker and manage it .the following command is

```
sudo rm -f <containerid>
```

```
habibun@hemel-22241042:~$ sudo docker rmi mysql
Untagged: mysql:latest
Untagged: mysql@sha256:4552fcc5d3cdb8cdee76ee25cce28bf60b0eb3ce93d25ba3bfff7a66b
fdcdee8
Deleted: sha256:82563e0cbf18162af685bfff03debc195b851c327c31163fd211c0144d3c1baae
Deleted: sha256:1ec6a25d9d0e9f5b6b9de54bd25a7abadf87e462e4a8f7bcdd2e51465514d1a0
Deleted: sha256:94db37d32ebfad636d2c0c57e92f333416c8df0328eca57c9acf4ee17f79146
Deleted: sha256:841f234a9a856b8a729e98ff390dd0e41ca8f08b63dd361597dd1b809047e63f
Deleted: sha256:4780dae798526f95105c00ebe09cc47591b30eff4de56c86c700430ebd0348b5
Deleted: sha256:64b93fdb873fcf262cc40fa492e6598b7df0b64ee02771df1aa120685b970d09
Deleted: sha256:696891c1289e24722d08ab7db3f61edb32874dcc6c764d748df077370f7bbae5
Deleted: sha256:26f817f40dbe49d6507930ebccae13645bbfb39ca63bf1ceaf769f7605df9b32
Deleted: sha256:7f9290a30ea78acd85c216f714bb5df589531db0b559bb3cd8f17332390a55b2
Deleted: sha256:b1594fddff8b8af91a2289850c56169c201baa26df4e7a98ecfeb6f669619279
Deleted: sha256:18a3ada103a9229bc00b549b66ae7caa0bc0eb47e785859d8b1346a254a871d1
```

2. To stop any container use the following command with the specific container Id

```
sudo docker stop <container Id>
```

```
habibun@hemel-22241042:~$ sudo docker stop 82563e0cbf18
```

3. For having the installed docker ,use this command

```
sudo docker info
```

```
habibun@hemel-22241042:~$ sudo docker info
Client: Docker Engine - Community
  Version: 26.0.0
  Context: default
  Debug Mode: false
  Plugins:
    buildx: Docker Buildx (Docker Inc.)
      Version: v0.13.1
      Path: /usr/libexec/docker/cli-plugins/docker-buildx
    compose: Docker Compose (Docker Inc.)
      Version: v2.25.0
      Path: /usr/libexec/docker/cli-plugins/docker-compose

Server:
  Containers: 4
    Running: 3
    Paused: 0
    Stopped: 1
  Images: 6
  Server Version: 26.0.0
  Storage Driver: overlay2
    Backing Filesystem: extfs
    Supports d_type: true
```

4. To see the images ,this command is needed

```
sudo docker images
```

```
habibun@hemel-22241042:~$ sudo docker images
REPOSITORY          TAG      IMAGE ID      CREATED        SIZE
hemel420/webmigrate    latest   3223dcc42b60  21 minutes ago  42.6MB
mywebsite           latest   3223dcc42b60  21 minutes ago  42.6MB
mysql               latest   82563e0cbf18  2 days ago    632MB
registry            2        9363667f8aec  12 days ago   25.4MB
registry            latest   9363667f8aec  12 days ago   25.4MB
localhost:5000/apline-img  latest   05455a08881e  2 months ago  7.38MB
alpine              latest   05455a08881e  2 months ago  7.38MB
hello-world         latest   d2c94e258dcb  11 months ago 13.3kB
mysql/mysql-server  latest   1d9c2219ff69  14 months ago 496MB
habibun@hemel-22241042:~$
```

5. The command is used to manage Docker Swarm configuration data.

```
docker config
```

```
habibun@hemel-22241042:~$ docker config
Usage: docker config COMMAND
Manage Swarm configs

Commands:
  create      Create a config from a file or STDIN
  inspect     Display detailed information on one or more configs
  ls          List configs
  rm          Remove one or more configs

Run 'docker config COMMAND --help' for more information on a command.
habibun@hemel-22241042:~$
```

6. We can check the version of the Docker using

```
docker version or sudo docker version
```

```
habibun@hemel-22241042:~$ docker version
Client: Docker Engine - Community
 Version:          26.0.0
 API version:      1.45
 Go version:       go1.21.8
 Git commit:       2ae903e
 Built:            Wed Mar 20 15:18:14 2024
 OS/Arch:          linux/arm64
 Context:          default
permission denied while trying to connect to the Docker daemon socket at unix:///var/run/docker.sock: Get "http://%2Fvar%2Frun%2Fdocker.sock/v1.45/version": dial unix /var/run/docker.sock: connect: permission denied
habibun@hemel-22241042:~$
```

```
habibun@hemel-22241042:~$ sudo docker version
Client: Docker Engine - Community
  Version:           26.0.0
  API version:      1.45
  Go version:       go1.21.8
  Git commit:       2ae903e
  Built:            Wed Mar 20 15:18:14 2024
  OS/Arch:          linux/arm64
  Context:          default

Server: Docker Engine - Community
  Engine:           [REDACTED]
    Version:         26.0.0
    API version:    1.45 (minimum version 1.24)
    Go version:     go1.21.8
    Git commit:     8b79278
    Built:          Wed Mar 20 15:18:14 2024
    OS/Arch:        linux/arm64
    Experimental:   false
  containerd:        Version: 1.6.28
                     GitCommit: ae07eda36dd25f8a1b98dfbf587313b99c0190bb
  runc:
```

7. First i used the docker pull command to pull a image file from docker Hub like Pull an image or a repository from a registry the command is

```
sudo docker pull ubuntu
```

```
habibun@hemel-22241042:~$ sudo docker pull ubuntu
Using default tag: latest
latest: Pulling from library/ubuntu
f4bb4e8dca02: Pull complete
Digest: sha256:77906da86b60585ce12215807090eb327e7386c8fafb5402369e421f44eff17e
Status: Downloaded newer image for ubuntu:latest
docker.io/library/ubuntu:latest
habibun@hemel-22241042:~$ █
```

8. Search the images in my system. Following command is needed

```
sudo docker search ubuntu
```

```
habibun@hemel-22241042:~$ sudo docker search ubuntu

NAME          DESCRIPTION
STARS      OFFICIAL
ubuntu        Ubuntu is a Debian-based Linux operating sys...
1222        [OK]
ubuntu-upstart DEPRECATED, as is Upstart (find other proces...
475         [OK]
open-liberty   Open Liberty multi-architecture images based...
189         [OK]
ubuntu-debootstrap DEPRECATED; use "ubuntu" instead
52          [OK]
neurodebian   NeuroDebian provides neuroscience research s...
27          [OK]
websphere-liberty WebSphere Liberty multi-architecture images ...
74          [OK]
ubuntu/nginx  Nginx, a high-performance reverse proxy & we...
112         [OK]
ubuntu/squid  Squid is a caching proxy for the Web. Long-t...
87          [OK]
ubuntu/cortex Cortex provides storage for Prometheus. Long...
4           [OK]
```

9. Run a command in a new container .we can use the docker run command to run a container

```
sudo docker run hello-world
```

```
habibun@hemel-22241042:~$ sudo 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.
    (arm64v8)
 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:
```

10. We can see the list of running containers by using the command

```
sudo docker ps -all
```

```
habibun@hemel-22241042:~$ sudo docker ps -all
CONTAINER ID IMAGE COMMAND CREATED STATUS
PORTS NAMES
edede763cc68 hello-world "/hello" 2 minutes ago Exited (0) 2 minutes ago
distracted_curiel
habibun@hemel-22241042:~$
```

11. For removing the a image the given command is needed .Rm is for Removing one or more containers. And rmi is for Removing one or more images .Rm -f if the container running it forcefully remove

```
sudo docker rm edede763cc68
```

```
habibun@hemel-22241042:~$ sudo docker rm edede763cc68
edede763cc68
habibun@hemel-22241042:~$ sudo docker rm edede763cc68
Error response from daemon: No such container: edede763cc68
habibun@hemel-22241042:~$
```

3. Create a docker image using docker file

To create a Docker image, first, create a directory named "DockerImage" using the command "mkdir DockerImage," navigate to it with "cd DockerImage," then create a Dockerfile using "touch Dockerfile." In the Dockerfile, include the necessary instructions.

```
mkdir DockerImage
cd DockerImage
touch Dockerfile
```

```
habibun@hemel-22241042:~$ mkdir DockerImage
habibun@hemel-22241042:~$ cd DockerImage
habibun@hemel-22241042:~/DockerImage$ touch Dockerfile
habibun@hemel-22241042:~/DockerImage$
```

```
FROM ubuntu
RUN apt-get update
CMD ["echo", "Hello I am Hemel"]
```

*Using the command we can see the content of the file.

```
cat Dockerfile
```

```
habibun@hemel-22241042:~/DockerImage$ cat Dockerfile
FROM ubuntu
RUN apt-get update
CMD ["echo","Hello I am Hemel"]

habibun@hemel-22241042:~/DockerImage$ █
```

Now , i have to build the docekrfile and for the i use the command where i also gave a name of the repository .The "-t" option in "sudo docker build -t myself" tags the image with a name (in this case "myself").

```
sudo docker build -t myself
```

For verifying the we can use the command to check the new built images

```
sudo docker images
```

```
habibun@hemel-22241042:~/DockerImage$ sudo docker build -t myself .
[sudo] password for habibun:
[+] Building 29.8s (6/6) FINISHED                                            docker:default
=> [internal] load build definition from Dockerfile                         0.0s
=> => transferring dockerfile: 110B                                         0.0s
=> [internal] load metadata for docker.io/library/ubuntu:latest           0.0s
=> [internal] load .dockerignore                                         0.0s
=> => transferring context: 2B                                           0.0s
=> [1/2] FROM docker.io/library/ubuntu:latest                           0.0s
=> [2/2] RUN apt-get update                                              29.4s
=> exporting to image                                                 0.2s
=> => exporting layers                                                 0.2s
=> => writing image sha256:c97024dfab3581ed5c899af4ca416c786d971df7d3b12 0.0s
=> => naming to docker.io/library/myself                                0.0s
habibun@hemel-22241042:~/DockerImage$ sudo docker images
REPOSITORY      TAG      IMAGE ID      CREATED      SIZE
myself          latest   c97024dfab35  12 seconds ago  115MB
ubuntu          latest   2b7cc08dcdbb  3 weeks ago   69.2MB
hello-world     latest   ee301c921b8a  10 months ago  9.14kB
habibun@hemel-22241042:~/DockerImage$ █
```

4.Running a container as Single Task with necessary steps.

To launch a container, you need to inspect the available images on your system using the command mentioned earlier.

```
sudo docker images
```

Now the image you want to run ,you need the IMAGE ID ,let check with **myself**

```
habitbun@hemel-22241042:~/DockerImage$ sudo docker images
REPOSITORY      TAG      IMAGE ID      CREATED      SIZE
<none>        <none>    c97024dfab35  11 minutes ago  115MB
myself         latest    1085fa1a8fbe  11 minutes ago  115MB
ubuntu          latest    2b7cc08dcdbb  3 weeks ago   69.2MB
hello-world     latest    ee301c921b8a  10 months ago  9.14kB
```

The command is

```
sudo docker run 1085fa1a8fbe
```

```
habitbun@hemel-22241042:~/DockerImage$ sudo docker run 1085fa1a8fbe
Hello I am Hemel
```

also , for see the status of all the container is used ,the command

```
sudo docker ps -a
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS
		PORTS NAMES		
52a08498c4c3	1085fa1a8fbe	"echo 'Hello I am He..."	2 minutes ago	Exited (0
) 2 minutes ago		charming_montalcini		
a6eb737be981	c97024dfab35	"/bin/sh -c '['echo'"	3 minutes ago	Exited (1
27) 3 minutes ago		eloquent_black		
192626cca719	c97024dfab35	"/bin/sh -c '['echo'"	5 minutes ago	Exited (1
27) 5 minutes ago		youthful_antonelli		
deef2b7bf354	c97024dfab35	"/bin/sh -c '['echo'"	5 minutes ago	Exited (1
27) 5 minutes ago		laughing_bhabha		
a6887797f017	hello-world	"/hello"	2 days ago	Exited (0
) 2 days ago		focused_chandrasekhar		

5.done Running a container in iterative mode and install different packages in the container.

I reviewed all the current images and then utilized the command to initiate a container in interactive mode with the "-it" option.

```
sudo docker run -it 2b7cc08dcdbb
```

To run ubuntu image in iterative mode.Then to update the packages you need to used the following Command

```
apt update
```

```
habibun@hemel-22241042:~$ sudo docker images
REPOSITORY      TAG      IMAGE ID      CREATED      SIZE
myself          latest   4f3edfc227ab  3 minutes ago  115MB
ubuntu          latest   2b7cc08dcdbb  3 weeks ago   69.2MB
hello-world     latest   ee301c921b8a  10 months ago  9.14kB
habibun@hemel-22241042:~$ sudo docker run -it 2b7cc08dcdbb
root@3955dcbc1d54:/# apt update
Get:1 http://ports.ubuntu.com/ubuntu-ports jammy InRelease [270 kB]
Get:2 http://ports.ubuntu.com/ubuntu-ports jammy-updates InRelease [119 kB]
Get:3 http://ports.ubuntu.com/ubuntu-ports jammy-backports InRelease [109 kB]
Get:4 http://ports.ubuntu.com/ubuntu-ports jammy-security InRelease [110 kB]
```

Following that, I employed a command to install the MY Paint software within the active container.

```
apt install mypaint
```

```
root@3955dcbc1d54:/# apt install mypaint

Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  adwaita-icon-theme at-spi2-core dbus dbus-user-session
  dconf-gsettings-backend dconf-service dmsetup fontconfig fontconfig-config
  fonts-dejavu-core gir1.2-atk-1.0 gir1.2-freedesktop gir1.2-gdkpixbuf-2.0
  gir1.2-glib-2.0 gir1.2-gtk-3.0 gir1.2-harfbuzz-0.0 gir1.2-pango-1.0
  gsettings-desktop-schemas gtk-update-icon-cache hicolor-icon-theme
  humanity-icon-theme libapparmor1 libargon2-1 libatk-bridge2.0-0 libatk1.0-0
```

6.Run a database container in the background

To set up a database, one must fetch the required database image. In this instance, I opted for MySQL Database, necessitating the execution of the ensuing command.

```
sudo docker pull mysql
```

```
habibun@hemel-22241042:~$ sudo docker pull mysql

Using default tag: latest
latest: Pulling from library/mysql
ea4e27ae0b4c: Pull complete
837904302482: Pull complete
3c574b61b241: Pull complete
654fc4f3eb2d: Pull complete
32da9c2187e3: Pull complete
dc99c3c88bd6: Pull complete
970181cc0aa6: Pull complete
d77b716c39d5: Pull complete
9e650d7f9f83: Pull complete
acc21ff36b4b: Pull complete
Digest: sha256:9d1c923e5f66a89f07285ee2641f8a53430a1ccd5e4a62b35eb8a48b74b9ff48
Status: Downloaded newer image for mysql:latest
docker.io/library/mysql:latest
```

Now,to run the MySQL container I used the

```
sudo docker run -- name=hemelsql -d mysql/mysql-server
```

```
habibun@hemel-22241042:~$ sudo docker run --name=hemelsql -d mysql/mysql-server
Unable to find image 'mysql/mysql-server:latest' locally
latest: Pulling from mysql/mysql-server
6a4a3ef82cdc: Pull complete
5518b09b1089: Pull complete
b6b576315b62: Pull complete
349b52643cc3: Pull complete
abe8d2406c31: Pull complete
c7668948e14a: Pull complete
c7e93886e496: Pull complete
Digest: sha256:d6c8301b7834c5b9c2b733b10b7e630f441af7bc917c74dba379f24eeeb6a313
Status: Downloaded newer image for mysql/mysql-server:latest
ddec706b139dfffb6226522834a0dfc0db1e763d511664216ae0b5f1796b07636
```

After that we need to Command to see the root Password of the database

```
sudo docker logs hemelsql
```

```
habibun@hemel-22241042:~$ sudo docker logs hemelsql
[Entrypoint] MySQL Docker Image 8.0.32-1.2.11-server
[Entrypoint] Initializing database
[Entrypoint] No password option specified for new database.
[Entrypoint] A random onetime password will be generated.
2024-03-28T09:01:17.270144Z 0 [Warning] [MY-011068] [Server] The syntax '--skip-host-cache' is deprecated and will be removed in a future release. Please use SET GLOBAL host_cache_size=0 instead.
2024-03-28T09:01:17.270209Z 0 [System] [MY-013169] [Server] /usr/sbin/mysqld (mysqld 8.0.32) initializing of server in progress as process 17
2024-03-28T09:01:17.277422Z 1 [System] [MY-013576] [InnoDB] InnoDB initialization has started.
2024-03-28T09:01:17.881545Z 1 [System] [MY-013577] [InnoDB] InnoDB initialization has ended.
2024-03-28T09:01:19.244506Z 6 [Warning] [MY-010453] [Server] root@localhost is created with an empty password ! Please consider switching off the --initialize-insecure option.
[Entrypoint] Database initialized
```

For the logs i found the

[GENERATED ROOT PASSWORD: @t0R3Sw5A,,046n9,B,8GBLX^rxB,Td^](#)

Moreover, it's essential to modify the password prior to utilizing the database.

```
habibun@hemel-22241042: ~
el.
2024-03-28T09:01:24.616969Z 0 [System] [MY-010931] [Server] /usr/sbin/mysqld: ready for connections. Version: '8.0.32' socket: '/var/lib/mysql/mysql.sock' port: 0 MySQL Community Server - GPL.
2024-03-28T09:01:24.616978Z 0 [System] [MY-011323] [Server] X Plugin ready for connections. Socket: /var/run/mysqld/mysqlx.sock
Warning: Unable to load '/usr/share/zoneinfo/iso3166.tab' as time zone. Skipping it.
Warning: Unable to load '/usr/share/zoneinfo/leapseconds' as time zone. Skipping it.
Warning: Unable to load '/usr/share/zoneinfo/tzdata.zi' as time zone. Skipping it.
Warning: Unable to load '/usr/share/zoneinfo/zone.tab' as time zone. Skipping it.
Warning: Unable to load '/usr/share/zoneinfo/zone1970.tab' as time zone. Skipping it.
[Entrypoint] GENERATED ROOT PASSWORD: @t0R3Sw5A,,046n9,B,8GBLX^rxB,Td^
[Entrypoint] ignoring /docker-entrypoint-initdb.d/*
2024-03-28T09:01:26.791838Z 11 [System] [MY-013172] [Server] Received SHUTDOWN from user root. Shutting down mysqld (Version: 8.0.32).
2024-03-28T09:01:28.547901Z 0 [System] [MY-010910] [Server] /usr/sbin/mysqld: Shutdown complete (mysqld 8.0.32) MySQL Community Server - GPL.

[Entrypoint] Setting root user as expired. Password will need to be changed before database can be used.
```

Now ,i can enter the database using the command

```
sudo docker exec -it hemelsql mysql -u root -p
```

THe welcome page

```
habibun@hemel-22241042:~$ sudo docker exec -it hemelsql mysql -u root -p
Enter password:
Welcome to the MySQL monitor. Commands end with ; or \g.
Your MySQL connection id is 38
Server version: 8.0.32

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> █
```

After that ,i used

```
ALTER USER 'root'@'localhost' IDENTIFIED BY '12345';
```

```
habibun@hemel-22241042:~$ sudo docker exec -it hemelsql mysql -u root -p
Enter password:
Welcome to the MySQL monitor. Commands end with ; or \g.
Your MySQL connection id is 52
Server version: 8.0.32

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> ALTER USER 'root'@'localhost' IDENTIFIED BY '12345';
Query OK, 0 rows affected (0.00 sec)

mysql> █
```

Subsequently, I executed fundamental SQL commands, provided below along with corresponding screenshots.

```
show databases;
create database cse484_is_wow;
```

```
show databases;
```

```
mysql> ALTER USER 'root'@'localhost' IDENTIFIED BY '12345';
Query OK, 0 rows affected (0.00 sec)

mysql> create database cse484_is_wow;
Query OK, 1 row affected (0.00 sec)

mysql> show database;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that
corresponds to your MySQL server version for the right syntax to use near 'databa
se' at line 1
mysql> show databases;
+-----+
| Database      |
+-----+
| cse484_is_wow |
| information_schema |
| mysql          |
| performance_schema |
| sys            |
+-----+
5 rows in set (0.00 sec)

mysql> 
```

7.Pushing my own image into the docker publick registry/hub.

To upload an image to Docker Hub, it is necessary to establish a Docker Hub account. So, I can visit the Docker Hub website using Docker Hub [Docker Hub](#) and signup there.

Then can logging using the Command and give the username and password

```
sudo docker login
```

```
habibun@hemel-22241042:~$ sudo 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 crea
te one.
You can log in with your password or a Personal Access Token (PAT). Using a limi
ted-scope PAT grants better security and is required for organizations using SSO
. Learn more at https://docs.docker.com/go/access-tokens/
Username: hemel420
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
```

Presently, I need to tag my Docker Image utilizing the specified command.

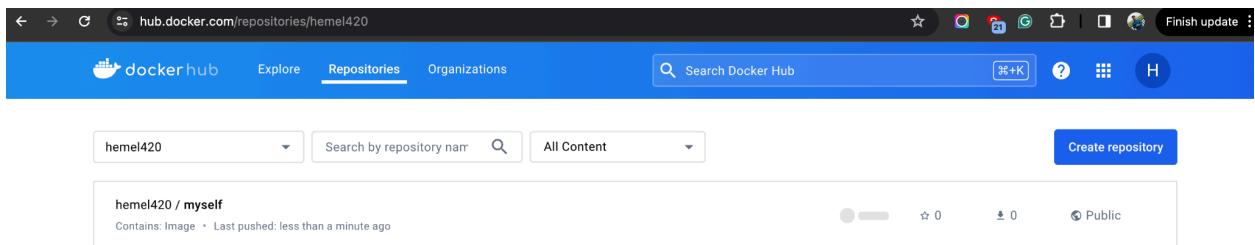
```
sudo docker tag myself hemel420/myself:latest
```

I then utilized a command to tag my Docker Image, and subsequently, I employed another command to upload the image to Docker Hub.

```
sudo docker push hemel420/myself:latest
```

```
habibun@hemel-22241042:~$ sudo docker tag myself hemel420/myself:latest
habibun@hemel-22241042:~$ sudo docker push hemel420/myself:latest
The push refers to repository [docker.io/hemel420/myself]
dcfbb60a0456: Pushing 2.778MB/45.58MB
dcfbb60a0456: Pushing 5.999MB/45.58MB
```

```
habibun@hemel-22241042:~$ sudo docker tag myself hemel420/myself:latest
[sudo] password for habibun:
habibun@hemel-22241042:~$ sudo docker push hemel420/myself:latest
The push refers to repository [docker.io/hemel420/myself]
dcfbb60a0456: Layer already exists
a510ae0f066c: Layer already exists
latest: digest: sha256:d66df6c9c1f033c77284822a8a3f37599cd4f7c5113a6a4d4b86377d3
0e93976 size: 741
```



8.Making my own private registry.

First, i have used the Command to pull the container

```
sudo docker pull registry
```

```
habibun@hemel-22241042:~$ sudo docker pull registry
Using default tag: latest
latest: Pulling from library/registry
619be1103602: Pull complete
5daf2fb85fb9: Pull complete
ca5f23059090: Pull complete
8f2a82336004: Pull complete
68c26f40ad80: Pull complete
Digest: sha256:fb9c9aef62af3955f6014613456551c92e88a67dcf1fc51f5f91bcd1832813f
Status: Downloaded newer image for registry:latest
docker.io/library/registry:latest
habibun@hemel-22241042:~$ █
```

Then , to install Docker Compose I used the

```
sudo apt install docker-compose
```

```
habibun@hemel-22241042:~$ sudo apt install docker-compose
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  python3-attr python3-distutils python3-docker python3-dockerpty
  python3-docopt python3-dotenv python3-jsonschema python3-persistent
  python3-setuptools python3-texttable python3-websocket
Suggested packages:
  python-attr-doc python-jsonschema-doc python-setuptools-doc
Recommended packages:
  docker.io
The following NEW packages will be installed
  docker-compose python3-attr python3-distutils python3-docker
  python3-dockerpty python3-docopt python3-dotenv python3-jsonschema
  python3-persistent python3-setuptools python3-texttable python3-websocket
0 to upgrade, 12 to newly install, 0 to remove and 127 not to upgrade.
Need to get 911 kB of archives.
After this operation, 4,841 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://us.archive.ubuntu.com/ubuntu jammy-updates/main amd64 python3-distutils all 3.10.8-1~22.04 [139 kB]
Get:2 http://us.archive.ubuntu.com/ubuntu jammy/universe amd64 python3-websocket all 1.2.3-1 [34.7 kB]
```

Then i run this "nano docker-compose.yml" is a command used to open the docker-compose.yml file for editing using the nano text editor.

```
nano docker-compose.yml
```

This Command to see the edited content

```
cat docker-compose.yml
```

```
habibun@hemel-22241042:~$ nano docker-compose.yml
habibun@hemel-22241042:~$ cat docker-compose.yml
version: '3'
services:
  registry:
    image: registry: 2
    ports:
      - "5000:5000"
```

"sudo docker-compose up -d" is a command to start Docker containers defined in the docker-compose.yml file in detached mode.

```
sudo docker-compose up -d
```

To pull the Alpine Linux Docker image from Docker Hub

```
sudo docker pull alpine
```

```
habibun@hemel-22241042:~$ nano docker-compose.yml
habibun@hemel-22241042:~$ cat docker-compose.yml
version: '3'
services:
  registry:
    image: registry:2
    ports:
      - "5000:5000"
habibun@hemel-22241042:~$ sudo docker-compose up -d
Creating network "habibun_default" with the default driver
Pulling registry (registry:2)...
2: Pulling from library/registry
Digest: sha256:fb9c9aef62af3955f6014613456551c92e88a67dcf1fc51f5f91bcd1832813f
Status: Downloaded newer image for registry:2
Creating habibun_registry_1 ... done
habibun@hemel-22241042:~$ sudo docker pull alpine
Using default tag: latest
latest: Pulling from library/alpine
4abcf2066143: Pull complete
Digest: sha256:c5b1261d6d3e43071626931fc004f70149baeba2c8ec672bd4f27761f8e1ad6b
Status: Downloaded newer image for alpine:latest
docker.io/library/alpine:latest
habibun@hemel-22241042:~$
```

Then i give a tag using the

```
sudo docker tag alpine localhost:5000/apline-img
```

And check the image using

```
sudo docker images
```

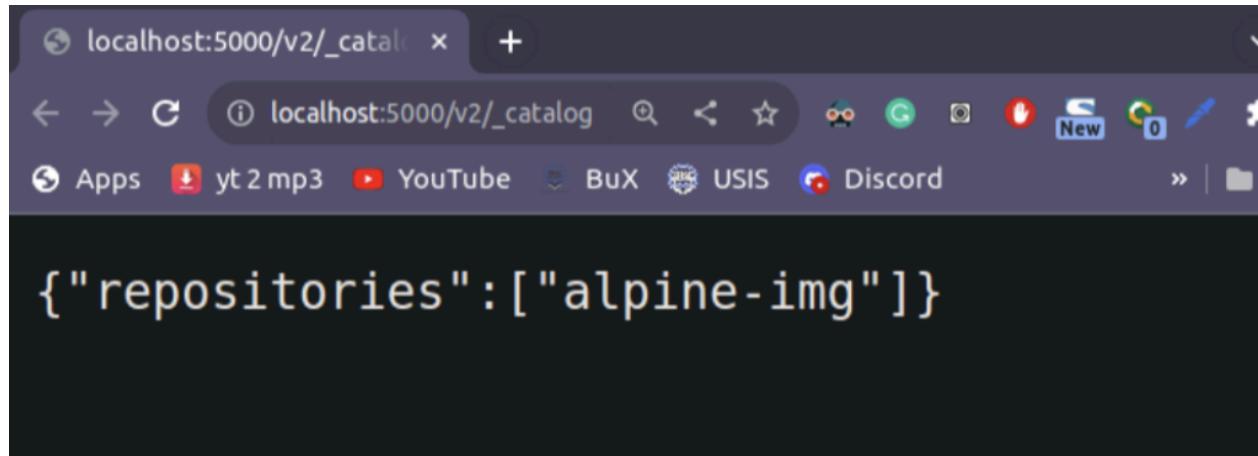
```
habibun@hemel-22241042:~$ sudo docker tag alpine localhost:5000/apline-img
habibun@hemel-22241042:~$ sudo docker images
REPOSITORY          TAG      IMAGE ID   CREATED        SIZE
mysql              latest   82563e0cbf18  2 days ago   632MB
registry           2        9363667f8aec  12 days ago  25.4MB
registry           latest   9363667f8aec  12 days ago  25.4MB
alpine             latest   05455a08881e  2 months ago  7.38MB
localhost:5000/apline-img  latest   05455a08881e  2 months ago  7.38MB
hello-world        latest   d2c94e258dcb  11 months ago 13.3kB
mysql/mysql-server latest   1d9c2219ff69  14 months ago 496MB
habibun@hemel-22241042:~$
```

Now i pushed the image using

```
sudo docker push localhost:5000/apline-img
```

```
habibun@hemel-22241042:~$ sudo docker push localhost:5000/alpine-img
Using default tag: latest
The push refers to repository [localhost:5000/alpine-img]
d4fc045c9e3a: Pushed
latest: digest: sha256:6457d53fb065d6f250e1504b9bc42d5b6c65941d57532c072d929dd06
28977d0 size: 528
habibun@hemel-22241042:~$
```

By following these steps, a private Docker registry has been established, accessible via the URL: https://localhost:5000/v2/_catalog on any web browser.



9. Creating a Small Website

To initiate the creation of a website, I began by creating a folder and then crafted an HTML file. Subsequently, I utilized the provided command.

```
mkdir website
touch index.html
nano index.html
cat index.html
```

```
habibun@hemel-22241042:~$ mkdir website
habibun@hemel-22241042:~$ ls
debian-vm.xml      Downloads          Pictures      ubuntu_share
Desktop            hardisk           Public        Videos
docker-compose.yml 'iso file for nested vm' snap         website
Documents          Music             Templates
habibun@hemel-22241042:~$ cd website
habibun@hemel-22241042:~/website$ touch index.html
habibun@hemel-22241042:~/website$ nano index.html
habibun@hemel-22241042:~/website$ cat index.html
<h1>Hello, Mam.
Please give me some bonous marks.</h1>

<a href = "https://www.google.com/">
    <button type = "button"> Click Me </button>
</a>
habibun@hemel-22241042:~/website$
```

Once again, we'll construct a container utilizing a Dockerfile, akin to what was accomplished in task 3. But here i also show the procedure

```
touch Dockerfile
nano Dockerfile
cat Dockerfile
```

```
habibun@hemel-22241042:~/website$ touch Dockerfile
habibun@hemel-22241042:~/website$ ls
Dockerfile  index.html
habibun@hemel-22241042:~/website$ nano Dockerfile
habibun@hemel-22241042:~/website$ cat Dockerfile
FROM nginx:alpine

COPY index.html /usr/share/nginx/html/
habibun@hemel-22241042:~/website$
```

After that i will paste the following command in the DockerFile.

```
FROM nginx:alpine
COPY index.html/usr/share/nginx/html/
```

I employed the initial command to construct the nwebsite image, followed by the second command to execute the Docker image.

```
sudo docker build -t nwebsite .
sudo docker run -d -p 80:80 nwebsite
```

```

habibun@hemel-22241042:~/website$ nano Dockerfile
habibun@hemel-22241042:~/website$ sudo docker build -t mywebsite .
[+] Building 3.8s (7/7) FINISHED                                            docker:default
=> [internal] load build definition from Dockerfile                      0.0s
=> => transferring dockerfile: 95B                                         0.0s
=> [internal] load metadata for docker.io/library/nginx:alpine           1.7s
=> [internal] load .dockerignore                                         0.0s
=> => transferring context: 2B                                         0.0s
=> [internal] load build context                                         0.0s
=> => transferring context: 185B                                         0.0s
=> [1/2] FROM docker.io/library/nginx:alpine@sha256:31bad00311cb5eeb8a66 1.8s
=> => resolve docker.io/library/nginx:alpine@sha256:31bad00311cb5eeb8a66 0.0s
=> => sha256:e289a478ace02cd72f0a71a5b2ec0594495e1fae8 11.74kB / 11.74kB 0.0s
=> => sha256:5126dce06df729f9a22956013e160f8b581d47095beec33 629B / 629B 0.4s
=> => sha256:cb3218c8a053881bd00f4fa93e9f87e2c6204761e39 2.50kB / 2.50kB 0.0s
=> => sha256:ed3e62e73b33c9cfa4b253060771e4a9eebb751ab43 1.90MB / 1.90MB 0.6s
=> => sha256:1d0dd2dc2265a581798226f7c79d134ac797f42db3f934d 957B / 957B 0.8s
=> => sha256:31bad00311cb5eeb8a6648beadcf67277a175da8998 8.71kB / 8.71kB 0.0s
=> => sha256:2b1ab92f023179da00446365a60daa60d72a1edeb697fb8 392B / 392B 0.8s
=> => extracting sha256:ed3e62e73b33c9cfa4b253060771e4a9eebb751ab438052f 0.1s
=> => sha256:6eba808ac059320c42179a6590b021f8695d3f12c2a 1.21kB / 1.21kB 0.9s
=> => extracting sha256:5126dce06df729f9a22956013e160f8b581d47095beec332 0.0s

```

```

habibun@hemel-22241042:~/website$ sudo docker run -d -p 80:80 mywebsite
58fd506cc0e3c93629de74578f3a77a8436e9e52207d9148fbfa0955dc753065

```

If I navigate to my web browser and enter "localhost:80" in the address bar, it will display this page.



Hello, Mam. Please give me some bonous marks.

```

habibun@hemel-22241042:~/website$ docker run -d -p 80:80 mywebsite
58fd506cc0e3c93629de74578f3a77a8436e9e52207d9148fbfa0955dc753065

```

10. Migrate the container having the applications into host machine

To transfer the new container, I need to upload it to my Docker Hub account, following the same procedure as previously done.

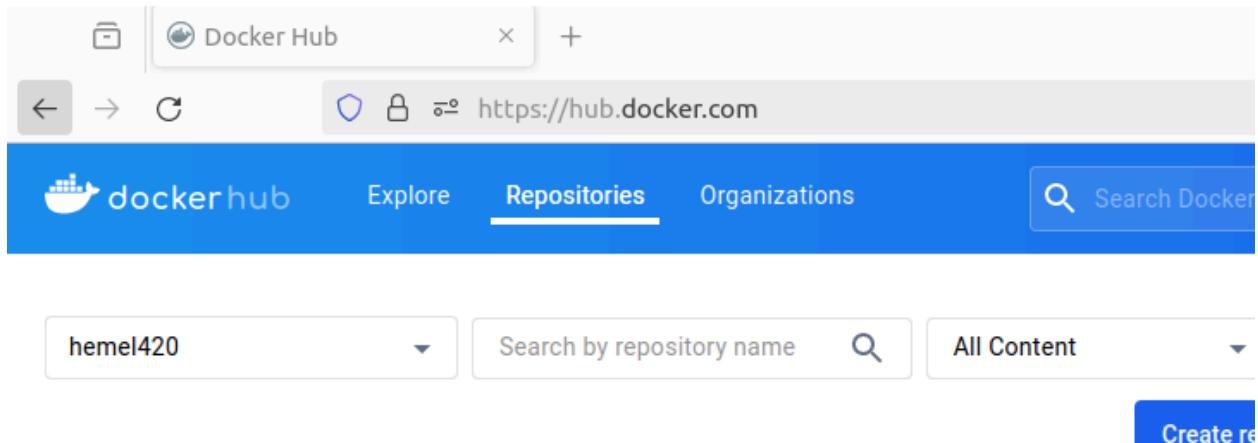
```
sudo docker login  
sudo docker tag mywebsite hemel420/webmigrate:latest  
sudo docker push hemel420/webmigrate:latest
```

```
habibun@hemel-22241042:~$ sudo docker tag mywebsite hemel420/webmigrate:latest
habibun@hemel-22241042:~$ sudo docker push hemel420/webmigrate:latest
The push refers to repository [docker.io/hemel420/webmigrate]
a810ff6decc7: Preparing
13c52683b537: Preparing
337b7d64083b: Preparing
cdd311f34c29: Preparing
3e8ad8bcb0ac: Preparing
74b4ff8dbbd1: Waiting
c018a48a857c: Waiting
0f73163669d4: Waiting
aedc3bda2944: Waiting
denied: requested access to the resource is denied
habibun@hemel-22241042:~$
```

```
habibun@hemel-22241042:~$ sudo 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: hemel420
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
habibun@hemel-22241042:~$
```



hemel420 / **webmigrate**
Contains: . Last pushed: 1 minute ago

Security unknown ⭐ 0 📾 0 Public

```
habibun@hemel-22241042:~ . Learn more at https://docs.docker.com/go/access-tokens/  
Username: hemel420  
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  
habibun@hemel-22241042:~$ sudo docker tag mywebsite hemel420/webmigrate:latest  
habibun@hemel-22241042:~$ sudo docker push hemel420/webmigrate:latest  
The push refers to repository [docker.io/hemel420/webmigrate]  
a810ff6decc7: Pushed  
13c52683b537: Mounted from library/nginx  
337b7d64083b: Mounted from library/nginx  
cdd311f34c29: Mounted from library/nginx  
3e8ad8bc0ac: Mounted from library/nginx  
74b4ff8dbbd1: Mounted from library/nginx  
c018a48a857c: Mounted from library/nginx  
0f73163669d4: Mounted from library/nginx  
aedc3bda2944: Mounted from library/nginx  
latest: digest: sha256:1d865a07e07dcda4feb8945097798a6e0742a4ac55af8b424f3082dac  
fa6fdad size: 2196  
habibun@hemel-22241042:~$
```

Now one of my friend we pull the container and run from his machine

```
sakib_sadman@badhon-22341082:~$ docker pull hemel420/webmigrate
Using default tag: latest
latest: Pulling from hemel420/webmigrate
619be1103602: Already exists
ed3e62e73b33: Pull complete
5126dce06df7: Pull complete
1d0dd2dc2265: Pull complete
2b1ab92f0231: Pull complete
6eba808ac059: Pull complete
57038e85fbb8: Pull complete
eec94c9845c0: Pull complete
4e20497bce93: Pull complete
Digest: sha256:1d865a07e07dcda4feb8945097798a6e0742a4ac55af8b424f3082dacfa6fdad
Status: Downloaded newer image for hemel420/webmigrate:latest
docker.io/hemel420/webmigrate:latest
sakib_sadman@badhon-22341082:~$
```

```
2024/03/28 17:16:00 [notice] 1#1. ext
sakib_sadman@badhon-22341082:~$ sudo docker run -d -p 80:80 hemel420/webmigrate
[sudo] password for sakib_sadman:
71f91e84c862143957daace603056107b94624077e90074219dc6de339c09dc5
sakib_sadman@badhon-22341082:~$
```

Hello, Mam. Please give me some bonous marks.

```

File Edit View Search Terminal Help
sakib_sadman@badhon-:
File Edit View Search Terminal Help
2024/03/28 17:13:32 [notice] 1#1: start worker
2024/03/28 17:16:06 [notice] 1#1: signal 2
2024/03/28 17:16:08 [notice] 1#1: exiting
2024/03/28 17:16:08 [notice] 1#1: exit
2024/03/28 17:16:08 [notice] 1#1: starting
2024/03/28 17:16:08 [notice] 1#1: signal 15
2024/03/28 17:16:08 [notice] 1#1: exiting
2024/03/28 17:16:08 [notice] 1#1: exit
2024/03/28 17:16:08 [notice] 1#1: starting
2024/03/28 17:16:08 [notice] 1#1: signal 2
2024/03/28 17:16:08 [notice] 1#1: exiting
2024/03/28 17:16:08 [notice] 1#1: exit
2024/03/28 17:16:08 [notice] 1#1: starting
2024/03/28 17:16:08 [notice] 1#1: signal 29
2024/03/28 17:16:08 [notice] 1#1: exiting
2024/03/28 17:16:08 [notice] 1#1: exit
2024/03/28 17:16:08 [notice] 1#1: starting
2024/03/28 17:16:08 [notice] 1#1: signal 29
2024/03/28 17:16:08 [notice] 1#1: exiting
2024/03/28 17:16:08 [notice] 1#1: exit
2024/03/28 17:16:08 [notice] 1#1: starting
2024/03/28 17:16:08 [notice] 1#1: signal 17
2024/03/28 17:16:08 [notice] 1#1: exiting
2024/03/28 17:16:08 [notice] 1#1: exit
[sudo] password for sakib_sadman:
1f191e84c862143957daace603056107b94624077e90074219dc6de339c09dc5
sakib_sadman@badhon-22341082:~$
```

THE END