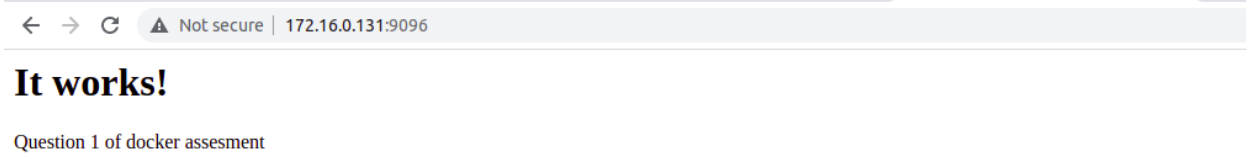
DOCKER ASSESSMENT

Question 1:- On VM install Docker Engg create web application containers provide port number 9095 of nginx and httpd on port number 9096?

```
[root@localhost ~]# docker pull httpd
Using default tag: latest
latest: Pulling from library/httpd
Digest: sha256:f70876d78442771406d7245b8d3425e8b0a86891c79811af94fb2e12af0fadeb
Status: Image is up to date for httpd:latest
docker.io/library/httpd:latest
[root@localhost ~]# docker run -d --name que1 -h Asses -p 9096:80 httpd
1bad3a3a209f0f06f1199ef1622820beb4629a0f12cb5efdc336a899e0407506
[root@localhost ~]# docer ps
-bash: docer: command not found
[root@localhost ~]# docker ps
CONTAINER ID   IMAGE     COMMAND              CREATED              STATUS              PORTS
                          NAMES
1bad3a3a209f   httpd     "httpd-foreground"   About a minute ago   Up About a minute   0.0.0.0:9096-
>80/tcp, :::9096->80/tcp   que1
[root@localhost ~]# docker exec -it que1 bash
root@Asses:/usr/local/apache2# ls
bin  build  cgi-bin  conf  error  htdocs  icons  include  logs  modules
root@Asses:/usr/local/apache2# cd htdocs
root@Asses:/usr/local/apache2/htdocs# ls
index.html
root@Asses:/usr/local/apache2/htdocs# cat index.html
<html><body><h1>It works!</h1></body></html>
root@Asses:/usr/local/apache2/htdocs# cat >> index.html
Question 1 of docker assesment
root@Asses:/usr/local/apache2/htdocs# exit
exit
[root@localhost ~]#
```



CentOS 7 64-bit(A)

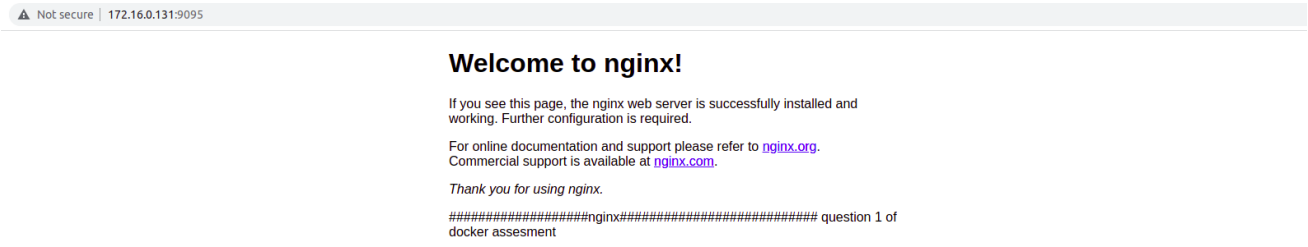
```
root@Asses:/usr/local/apache2/htdocs# ls
index.html
root@Asses:/usr/local/apache2/htdocs# cat index.html
<html><body><h1>It works!</h1></body></html>
root@Asses:/usr/local/apache2/htdocs# cat >> index.html
Question 1 of docker assesment
root@Asses:/usr/local/apache2/htdocs# exit
exit
[root@localhost ~]# ip a s
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: ens33: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc pfifo_fast state DOWN group default qle
n 1000
    link/ether 00:0c:29:57:54:ba brd ff:ff:ff:ff:ff:ff
3: ens36: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 10
00
    link/ether 00:0c:29:57:54:c4 brd ff:ff:ff:ff:ff:ff
    inet 172.16.0.131/24 brd 172.16.0.255 scope global noprefixroute dynamic ens36
       valid_lft 1799sec preferred_lft 1799sec
    inet6 fe80::5d06:b420:f33c:5640/64 scope link noprefixroute
       valid_lft forever preferred_lft forever
4: docker0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default
    link/ether 02:42:b2:12:a6:bc brd ff:ff:ff:ff:ff:ff
    inet 172.17.0.1/16 brd 172.17.255.255 scope global docker0
       valid_lft forever preferred_lft forever
    inet6 fe80::42:b2ff:fe12:a6bc/64 scope link
       valid_lft forever preferred_lft forever
8: veth294b6cc@if7: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue master docker0 state UP
 group default
    link/ether ba:c5:f1:02:65:a0 brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet6 fe80::b8c5:f1ff:fe02:65a0/64 scope link
       valid_lft forever preferred_lft forever
```

```
[root@localhost ~]# docker run -d --name ques1 -h Assesm1 -p 9095:80 nginx
fe362812023155d801c1cf08f0ab887e1cdb181f601e6e4d3788067838dbcf98
[root@localhost ~]# docker ps
CONTAINER ID   IMAGE     COMMAND                  CREATED          STATUS          PORTS
                  NAMES
fe3628120231   nginx     "/docker-entrypoint.■"   14 seconds ago   Up 12 seconds   0.0.0.0:9095->80/
tcp, :::9095->80/tcp   ques1
1bad3a3a209f   httpd     "httpd-foreground"       32 minutes ago   Up 32 minutes   0.0.0.0:9096->80/
tcp, :::9096->80/tcp   que1
[root@localhost ~]#
```

```
bug             doc             gdb         locale    pam-configs  tabset
root@Assesm1:/usr/share# cd nginx
root@Assesm1:/usr/share/nginx# ls
html
root@Assesm1:/usr/share/nginx# cd html
root@Assesm1:/usr/share/nginx/html# ls
50x.html  index.html
root@Assesm1:/usr/share/nginx/html# cat index.html
<!DOCTYPE html>
<html>
<head>
<title>Welcome to nginx!</title>
<style>
html { color-scheme: light dark; }
body { width: 35em; margin: 0 auto;
font-family: Tahoma, Verdana, Arial, sans-serif; }
</style>
</head>
<body>
<h1>Welcome to nginx!</h1>
<p>If you see this page, the nginx web server is successfully installed and
working. Further configuration is required.</p>

<p>For online documentation and support please refer to
<a href="http://nginx.org/">nginx.org</a>.<br/>
Commercial support is available at
<a href="http://nginx.com/">nginx.com</a>.</p>

<p><em>Thank you for using nginx.</em></p>
</body>
</html>
root@Assesm1:/usr/share/nginx/html# cat >> index.html
####################nginx##############################
question 1 of docker assesment
root@Assesm1:/usr/share/nginx/html# exit
```



Question 2:- What are the features of underlying operating system, explain type of storage that docker can provide and create container provide storage =type =volume, name vol10?

Some of the features of underlying operating system are:
Namespaces :
A namespace is an abstraction that covers a global system resource, making it appear to processes within the namespace that they have their own isolated instance of the

global resource. Changes to the global resource are visible to other processes in the namespace but are invisible to other processes.
Namespaces can be used to implement containers.

Types of namespaces:

1. Mount (mnt) Mount namespaces
2. Process ID (pid)
3. Network (net)
4. Interprocess Communication (ipc)
5. UTS.
6. User ID (user)
7. Control group (cgroup) Namespace
8. Time Namespace

Control Group (cgroup):- Control Groups are used by the kernel to organise processes for system resource management. Control Groups distribute CPU time, system memory, network bandwidth, or a mix of these resources among user-defined task groups.

SE-Linux: - SE-Linux uses SE-Linux policy and labels to ensure secure container isolation. It acts like a firewall for the same.

It has three states:

Enforce

Permissive

Disable.

SE-Comp: - SE-Comp is a kernel feature that allows you to filter system call (syscalls) from container to the kernel. SE-Comp gives an attacker a restricted number of syscalls from the container, allowing for greater fine-grained control.

Types of storage that docker can provide are:

Data Volume:

A volume is an area of isolated storage on the host system on which a Docker Engine is running, that is also managed by Docker.

Bind Mounts:

With a bind mount, data can be stored on any attached storage area or device that is connected to the host system.

```
[root@localhost ~]# docker volume ls
DRIVER    VOLUME NAME
[root@localhost ~]# docker volume create vol10
vol10
[root@localhost ~]# docker run -d --name que2 -v vol10:/usr/share/nginx/html/nginx
"docker run" requires at least 1 argument.
See 'docker run --help'.

Usage:  docker run [OPTIONS] IMAGE [COMMAND] [ARG...]

Run a command in a new container
[root@localhost ~]# docker run -d --name que2 -v vol10:/usr/share/nginx/html/ nginx
7af4b5833d84d5b1a61aff510d85e89e845dd42f463b54dc5f0e1de344668459
[root@localhost ~]# docker ps
CONTAINER ID   IMAGE     COMMAND                  CREATED          STATUS          PORTS
                    NAMES
7af4b5833d84   nginx     "/docker-entrypoint.■"   13 seconds ago   Up 13 seconds   80/tcp
                    que2
fe3628120231   nginx     "/docker-entrypoint.■"   24 minutes ago   Up 23 minutes   0.0.0.0:9095->80/
tcp, :::9095->80/tcp   ques1
1bad3a3a209f   httpd     "httpd-foreground"       56 minutes ago   Up 56 minutes   0.0.0.0:9096->80/
tcp, :::9096->80/tcp   que1
[root@localhost ~]#
```

```
[root@localhost ~]# docker ps
CONTAINER ID   IMAGE     COMMAND                  CREATED             STATUS             PORTS
                    NAMES
7af4b5833d84   nginx     "/docker-entrypoint.■"   3 minutes ago       Up 3 minutes       80/tcp
                    que2
fe3628120231   nginx     "/docker-entrypoint.■"   27 minutes ago      Up 27 minutes      0.0.0.0:909
5->80/tcp, :::9095->80/tcp   ques1
1bad3a3a209f   httpd     "httpd-foreground"       About an hour ago   Up About an hour   0.0.0.0:909
6->80/tcp, :::9096->80/tcp   que1
[root@localhost ~]# docker exec -it que2 bash
root@7af4b5833d84:/# cd /usr/share/nginx/html
root@7af4b5833d84:/usr/share/nginx/html# cat >> index.html
##########question 2 of docker assesment############
root@7af4b5833d84:/usr/share/nginx/html# _
```

```
        "Type": "volume",
        "Name": "vol10",
        "Source": "/var/lib/docker/volumes/vol10/_data",
        "Destination": "/usr/share/nginx/html",
        "Driver": "local",
        "Mode": "z",
        "RW": true,
        "Propagation": ""
```

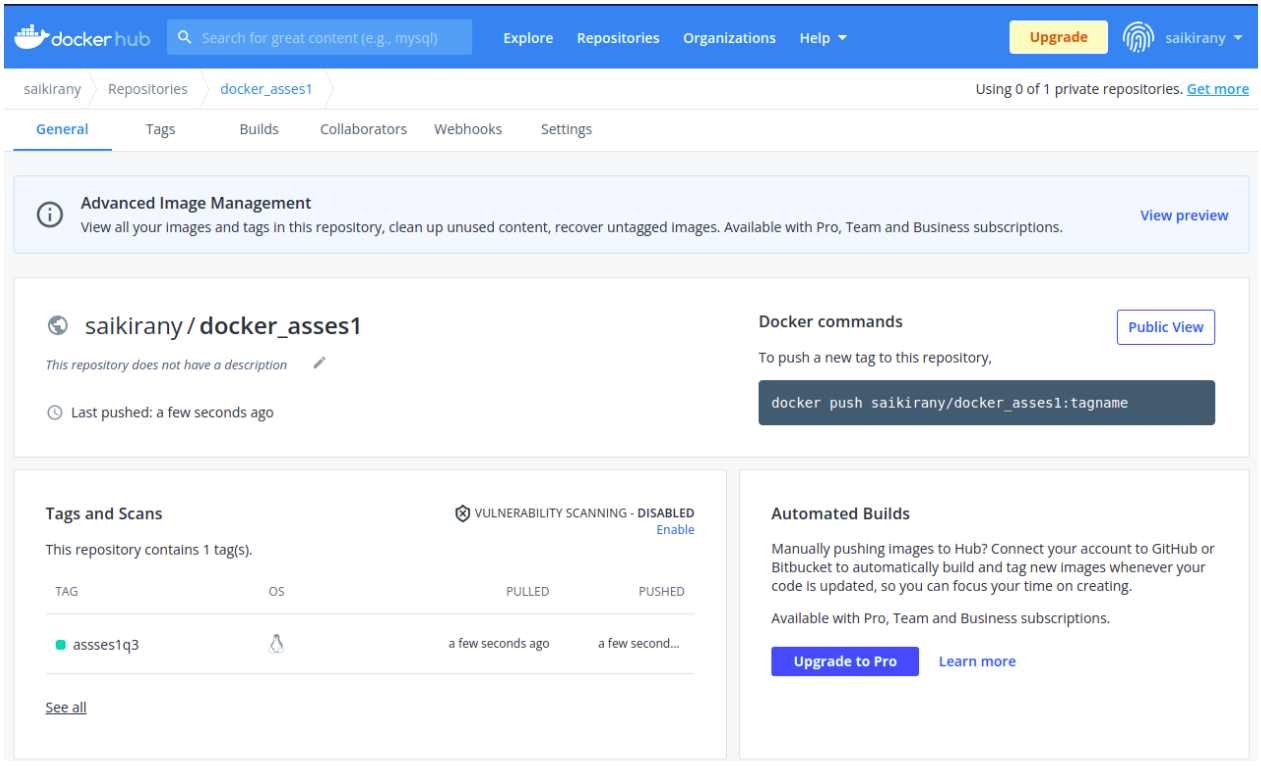
Qusetion 3:- Create docker file for httpd, build image out of that, create container, make that Image publically available [upload on docker hub]?

```
  httpd-2.4.37-39.module_el8.4.0+950+0577e6ac.1.x86_64
  httpd-filesystem-2.4.37-39.module_el8.4.0+950+0577e6ac.1.noarch
  httpd-tools-2.4.37-39.module_el8.4.0+950+0577e6ac.1.x86_64
  mailcap-2.1.48-3.el8.noarch
  mod_http2-1.15.7-3.module_el8.4.0+778+c970deab.x86_64

Complete!
Removing intermediate container 93af4b6513bd
 ---> fba2e69872f4
Step 3/6 : RUN systemctl enable httpd
 ---> Running in 5eb177ca372b
Created symlink /etc/systemd/system/multi-user.target.wants/httpd.service ■ /usr/lib/systemd/system/
httpd.service.
Removing intermediate container 5eb177ca372b
 ---> f2f54edc19ef
Step 4/6 : COPY index.html /var/www/html
 ---> 4970b4a5fd75
Step 5/6 : CMD ["httpd","-D","FOREGROUND"]
 ---> Running in 16be78bdc6f6
Removing intermediate container 16be78bdc6f6
 ---> a4d2a841bcf4
Step 6/6 : EXPOSE 80
 ---> Running in 986accdb3f8f
Removing intermediate container 986accdb3f8f
 ---> c3973986783d
Successfully built c3973986783d
Successfully tagged dhub:q3
[root@localhost assessment]# docker images
REPOSITORY   TAG       IMAGE ID       CREATED              SIZE
dhub         q3        c3973986783d   About a minute ago   286MB
cmd          c1        1a2d9ce49209   18 hours ago         231MB
casd1        d11       c32ebcba4770   18 hours ago         231MB
casd         d1        3f8d34ade112   18 hours ago         231MB
httpd        latest    1132a4fc88fa   8 days ago           143MB
nginx        latest    87a94228f133   2 weeks ago          133MB
centos       latest    5d0da3dc9764   6 weeks ago          231MB
[root@localhost assessment]# docker run_
```

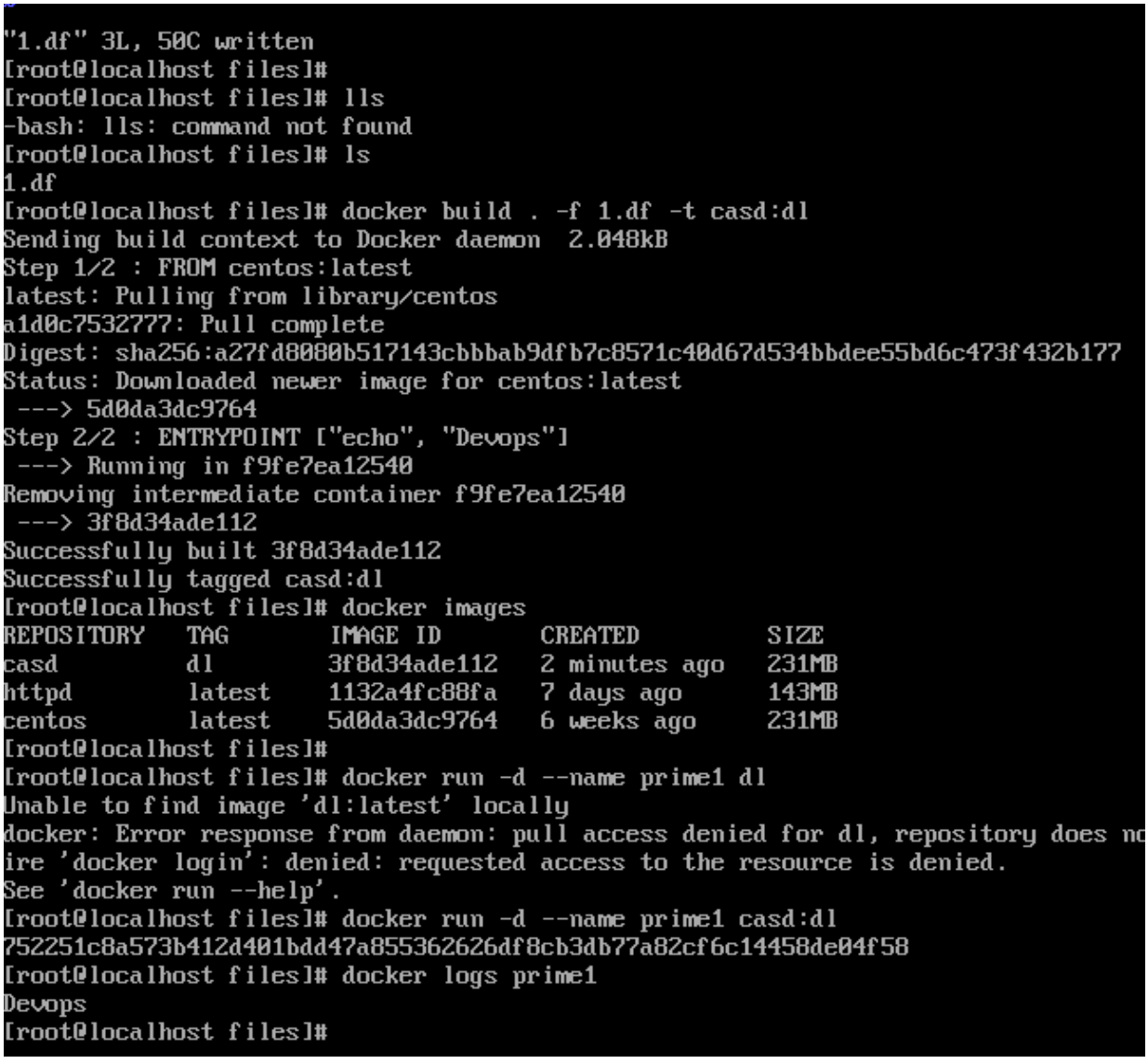
```
[root@localhost assessment]# docker run -d --name que2 -p 9095:80 dhub:q3
docker: Error response from daemon: Conflict. The container name "/que2" is already in use by contai
ner "7af4b5833d84d5b1a61aff510d85e89e845dd42f463b54dc5f0e1de344668459". You have to remove (or renam
e) that container to be able to reuse that name.
See 'docker run --help'.
[root@localhost assessment]# docker run -d --name que3 -p 9095:80 dhub:q3
56370cd9193f7e67c87190a5eb7004c2f2d6d640b4309de790cf5d9824154f48
[root@localhost assessment]# docker exec -it que3 bash
;@56370cd9193f:/[root@56370cd9193f /]# cd /var/www
;@56370cd9193f:/var/www[root@56370cd9193f www]# ls
cgi-bin  html
;@56370cd9193f:/var/www[root@56370cd9193f www]# cd html
;@56370cd9193f:/var/www/html[root@56370cd9193f html]# cat >>index.html
repository for question 3 of docker assesment
;@56370cd9193f:/var/www/html[root@56370cd9193f html]# exit
exit
[root@localhost assessment]# docker tag dhub:q3 saikirany
[root@localhost assessment]# docker tag dhub:q3 saikirany/docker_asses1:assses1q3
```

```
dhub          q3          c3973986783d    About a minute ago    286MB
cmd           c1          1a2d9ce49209    18 hours ago          231MB
casd1         d11         c32ebcba4770    18 hours ago          231MB
casd          dl          3f8d34ade112    18 hours ago          231MB
httpd         latest      1132a4fc88fa    8 days ago            143MB
nginx         latest      87a94228f133    2 weeks ago           133MB
centos        latest      5d0da3dc9764    6 weeks ago           231MB
[root@localhost assessment]# docker run -d --name que2 -p 9095:80 dhub:q3
docker: Error response from daemon: Conflict. The container name "/que2" is already in use by contai
ner "7af4b5833d84d5b1a61aff510d85e89e845dd42f463b54dc5f0e1de344668459". You have to remove (or renam
e) that container to be able to reuse that name.
See 'docker run --help'.
[root@localhost assessment]# docker run -d --name que3 -p 9095:80 dhub:q3
56370cd9193f7e67c87190a5eb7004c2f2d6d640b4309de790cf5d9824154f48
[root@localhost assessment]# docker exec -it que3 bash
;@56370cd9193f:/[root@56370cd9193f /]# cd /var/www
;@56370cd9193f:/var/www[root@56370cd9193f www]# ls
cgi-bin  html
;@56370cd9193f:/var/www[root@56370cd9193f www]# cd html
;@56370cd9193f:/var/www/html[root@56370cd9193f html]# cat >>index.html
repository for question 3 of docker assesment
;@56370cd9193f:/var/www/html[root@56370cd9193f html]# exit
exit
[root@localhost assessment]# docker tag dhub:q3 saikirany
[root@localhost assessment]# docker tag dhub:q3 saikirany/docker_asses1:assses1q3
[root@localhost assessment]# docker push saikirany/docker_asses1:asses1q3
The push refers to repository [docker.io/saikirany/docker_asses1]
tag does not exist: saikirany/docker_asses1:asses1q3
[root@localhost assessment]# docker push saikirany/docker_asses1:assses1q3
The push refers to repository [docker.io/saikirany/docker_asses1]
8c9ea2de2c94: Pushed
a8c7407b3c45: Pushed
ab3637afe1dc: Pushed
74ddd0ec08fa: Mounted from library/centos
assses1q3: digest: sha256:2ef1c2d365b8a15b683905a4906abf7060fcc5e7e6109a833ac37cce20a134e4 size: 115
5
[root@localhost assessment]#
```



Question 4:- What is difference between Entrypoint and CMD?

When we are using a container, this command CMD, sets default settings that can be modified using the Docker Command Line Interface (CLI). Whereas if we use this command ENTRYPOINT, the default parameters cannot be modified.



```
"2.df" [New] 4L, 50C written
[root@localhost files]# ls
1.df  2.df
[root@localhost files]# docker build . -f 2.df -t casd1:d11
Sending build context to Docker daemon  3.072kB
Step 1/2 : FROM centos:latest
 ---> 5d0da3dc9764
Step 2/2 : ENTRYPOINT ["echo","DevOps"]
 ---> Running in 06deba3696de
Removing intermediate container 06deba3696de
 ---> c32ebcba4770
Successfully built c32ebcba4770
Successfully tagged casd1:d11
[root@localhost files]# docker run -d --name prime2 casd1:d11 Good Students
e7bf7c6f4fa8265ddde0abc783a176b036db0a6dc36ea2cc05125e21fe7b86d0
[root@localhost files]# docker images
REPOSITORY   TAG       IMAGE ID       CREATED              SIZE
casd1        d11       c32ebcba4770   About a minute ago   231MB
casd         dl        3f8d34ade112   11 minutes ago       231MB
httpd        latest    1132a4fc88fa   7 days ago           143MB
centos       latest    5d0da3dc9764   6 weeks ago          231MB
[root@localhost files]# docker ps -a
CONTAINER ID   IMAGE       COMMAND                  CREATED          STATUS
  PORTS                                  NAMES
e7bf7c6f4fa8   casd1:d11   "echo DevOps Good St…"   25 seconds ago   Exited (0) 25 seconds ago
                                        prime2
752251c8a573   casd:dl     "echo Devops"            6 minutes ago    Exited (0) 6 minutes ago
                                        prime1
9d79a969c059   httpd       "httpd-foreground"       29 hours ago     Exited (255) About an hour ago
  0.0.0.0:8080->80/tcp, :::8080->80/tcp   ef
458af4b0f830   httpd       "httpd-foreground"       30 hours ago     Exited (255) About an hour ago
  80/tcp                                 user1
[root@localhost files]# docker logs prime2
DevOps Good Students
[root@localhost files]# _
```

```
~
"3.df" [New] 3L, 49C written
[root@localhost files]# ls
1  1.df  2.df  3.df
[root@localhost files]# docker build . -f 3.df -t cmd:c1
Sending build context to Docker daemon   5.12kB
Step 1/2 : FROM centos:latest
 ---> 5d0da3dc9764
Step 2/2 : CMD ["echo","Saikriran_CMD"]
 ---> Running in f9dac39320a1
Removing intermediate container f9dac39320a1
 ---> 1a2d9ce49209
Successfully built 1a2d9ce49209
Successfully tagged cmd:c1
[root@localhost files]# docker images
REPOSITORY   TAG       IMAGE ID       CREATED          SIZE
cmd          c1        1a2d9ce49209   22 seconds ago   231MB
casd1        d11       c32ebcba4770   10 minutes ago   231MB
casd         dl        3f8d34ade112   21 minutes ago   231MB
httpd        latest    1132a4fc88fa   7 days ago       143MB
centos       latest    5d0da3dc9764   6 weeks ago      231MB
[root@localhost files]# docker run -d --name prime3 cmd:c1
a5556e78a9871d948aed743c5ee4c9ac5537a741d002c43eedf23e13227893a6
[root@localhost files]# docker logs prime3
Saikriran_CMD
[root@localhost files]# cat 3.df
FROM centos:latest
CMD ["echo","Saikriran_CMD"]
```