Problem 1

Run the container hello-world

```
manar@manar-VirtualBox:~/linux$ docker run hello-world
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
e6590344b1a5: Pull complete
Digest: sha256:424f1f86cdf501deb591ace8d14d2f40272617b51b374915a87a2886b2025ece
Status: Downloaded newer image for hello-world:latest

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.
    (amd64)
```

- Check the container status

```
PROBLEMS   OUTPUT   DEBUG CONSOLE   TERMINAL   PORTS                                                        bash + ∨  ⫿ 🗑 ⋯ ∧ ✕
manar@manar-VirtualBox:~/linux$ docker ps -a
CONTAINER ID   IMAGE                     COMMAND          CREATED        STATUS                  PORTS
                                                                                                NAMES
0522fcfc50d8   hello-world               "/hello"         2 minutes ago  Exited (0) 2 minutes ago
                                                                                                eager_hoover
```

- Start the stopped container

```
manar@manar-VirtualBox:~/linux$ docker ps -a
CONTAINER ID   IMAGE                 COMMAND                CREATED         STATUS                   PORTS                      NAMES
da5b92113174   ubuntu                "sleep 10"             8 minutes ago   Exited (0) 7 minutes ago                            tender_kapitsa
67b3d5a8923c   ubuntu                "bash"                 9 minutes ago   Exited (0) 8 minutes ago                            distracted_ritc
hie
2141ad82fd5a   ubuntu                "bash"                 10 minutes ago  Exited (0) 10 minutes ago                           nifty_napier
1c15a5080abd   kindest/node:v1.32.3  "/usr/local/bin/entr…" 20 hours ago    Up 20 hours              127.0.0.1:37319->6443/tcp  kind-control-pl
ane
manar@manar-VirtualBox:~/linux$ docker start da5b92113174
da5b92113174
manar@manar-VirtualBox:~/linux$ docker ps -a
CONTAINER ID   IMAGE                 COMMAND                CREATED         STATUS                   PORTS                      NAMES
da5b92113174   ubuntu                "sleep 10"             8 minutes ago   Up 3 seconds                                        tender_kapitsa
67b3d5a8923c   ubuntu                "bash"                 9 minutes ago   Exited (0) 8 minutes ago                            distracted_ritc
hie
2141ad82fd5a   ubuntu                "bash"                 11 minutes ago  Exited (0) 11 minutes ago                           nifty_napier
1c15a5080abd   kindest/node:v1.32.3  "/usr/local/bin/entr…" 20 hours ago    Up 20 hours              127.0.0.1:37319->6443/tcp  kind-control-pl
ane
```

- Remove the container

```
manar@manar-VirtualBox:~/linux$ docker rm 0522fcfc50d8
0522fcfc50d8
```

- Remove the image

```
manar@manar-VirtualBox:~/linux$ docker rmi hello-world
Untagged: hello-world:latest
Untagged: hello-world@sha256:424f1f86cdf501deb591ace8d14d2f40272617b51b374915a87a2886b2025ece
Deleted: sha256:74cc54e27dc41bb10dc4b2226072d469509f2f22f1a3ce74f4a59661a1d44602
Deleted: sha256:63a41026379f4391a306242eb0b9f26dc3550d863b7fdbb97d899f6eb89efe72
```

Run container centos or ubuntu in an interactive mode

```
manar@manar-VirtualBox:~/linux$ docker run -it ubuntu
Unable to find image 'ubuntu:latest' locally
latest: Pulling from library/ubuntu
2726e237d1a3: Pull complete
Digest: sha256:1e622c5f073b4f6bfad6632f2616c7f59ef256e96fe78bf6a595d1dc4376ac02
Status: Downloaded newer image for ubuntu:latest
root@3a2fb620cacd:/#
```

▪ Run the following command in the container "echo docker "

```
root@3a2fb620cacd:/# echo "docker"
docker
```

▪ Open a bash shell in the container and touch a file named hello-docker

```
root@3a2fb620cacd:/# touch file
root@3a2fb620cacd:/# ls
bin  boot  dev  etc  file  home  lib  lib64  media  mnt  opt  proc  root  run  sbin  srv  sys  tmp  usr  var
```

▪ Stop the container and remove it. Write your comment about the file hello-docker

```
root@3a2fb620cacd:/# exit
exit
manar@manar-VirtualBox:~/linux$ docker ps -a
CONTAINER ID   IMAGE                COMMAND          CREATED        STATUS                 PORTS
                                                                                          NAMES
3a2fb620cacd   ubuntu               "/bin/bash"      8 minutes ago  Exited (130) 30 seconds ago
```

```
manar@manar-VirtualBox:~/linux$ docker rm 3a2fb620cacd
3a2fb620cacd
```

>> file deleted because container is deleted

▪ Remove all stopped containers

```
manar@manar-VirtualBox:~/linux$ docker container prune
WARNING! This will remove all stopped containers.
Are you sure you want to continue? [y/N] y
Deleted Containers:
b95070769b241d652c51a44123b565835d7be2a6278d2d568eaa79b3861c37b1
df00e2b039f67c473b103e614d1ccff4c89d8ac6115ef09ba997f1725a5be455
2f22a69a08d664d8de550bab193ee3892827661911b7d498eace77a8baa8ce73
7487496355ca340322b8dd003e0cba70981bbaa370bd2751a5cec32bf507bdb0
9662c5455ee7672184b5f58d912f1864e208b42ebd5ddf1720022c0ef8175ccc
0c4afbad2f75bc348519e9318300b9d0ce0241627077a76f9e3e4ddeea69c6db
e22823562d5a0c746845cbb9660b9643c60884044901a06599f52f7c56fb0ad5
8c2e5819cd1d62f7fd1d8ad60cf3a4e735955a435cd43c00739a4bc7cd241554
e67af7972934fd3d951d3358362ee5dca63767c7604686f1744754527167d7f4
b66bea62406675022291bdfe11c0bc005a773770fe23df1a15a1d5e6ebc69f4f
646d9e4488b1a70f123cf07306b04b80538d59a5545e68ae6bfa4582cb28527a
73a400f8d9e6debfe157eb78166e8bb5af91b96d113fb0049a03af72267e1847
dddbd7ae4c94d11e1d4690db9b7a3ac5fe6d2cfb7c14c86bf9dbd0b21695c1d3

Total reclaimed space: 13.73MB
```

Run a container httpd with name apache and attach a volume 2 volumes to the container

▪ Volume1 for containing static html file

▪ Volume2 for containing httpd configuration

```
manar@manar-VirtualBox:~/linux$ docker volume create html_vol
html_vol
manar@manar-VirtualBox:~/linux$ docker volume create config_vol
config_vol
manar@manar-VirtualBox:~/linux$ docker run -dit \
--name apache \
-v html-vol:/usr/local/apache2/htdocs \
-v config-vol:/usr/local/apache2/conf \
httpd
Unable to find image 'httpd:latest' locally
latest: Pulling from library/httpd
8a628cdd7ccc: Pull complete
60ba3d18ad64: Pull complete
4f4fb700ef54: Pull complete
03e322382f93: Pull complete
4ad6b63c403f: Pull complete
c613327bbca6: Pull complete
Digest: sha256:4564ca7604957765bd2598e14134a1c6812067f0daddd7dc5a484431dd03832b
Status: Downloaded newer image for httpd:latest
91abd89baf61fb1ef5f82ec75e8d94cba51808bd2cde1f96ce2e68bcee27c2de
```

▪ Remove the container

```
manar@manar-VirtualBox:~/linux$ docker rm 91abd89baf61
Error response from daemon: cannot remove container "/apache": container is running: stop the container before removing or force remove
manar@manar-VirtualBox:~/linux$ docker stop 91abd89baf61
91abd89baf61
manar@manar-VirtualBox:~/linux$ docker rm 91abd89baf61
91abd89baf61
manar@manar-VirtualBox:~/linux$
```

▪ Run a new container with the following: ▪ Attach the 2 volumes that was attached to the

previous container▪ Map port 80 to port 9898 on you host machine

▪ Access the html files from your browser

```
manar@manar-VirtualBox:~/linux$ docker run -dit \
--name apache-new \
-v html-vol:/usr/local/apache2/htdocs \
-v config-vol:/usr/local/apache2/conf \
-p 9898:80 \
httpd
4f0d5556b706916ee18a41e13907cee56e0947311c1776e4b476e07d590641e0
manar@manar-VirtualBox:~/linux$ docker ps
CONTAINER ID   IMAGE                  COMMAND                CREATED         STATUS         PORTS                                            NAMES
4f0d5556b706   httpd                  "httpd-foreground"     10 seconds ago  Up 9 seconds   0.0.0.0:9898->80/tcp, [::]:9898->80/tcp          apache-new
1c15a5080abd   kindest/node:v1.32.3   "/usr/local/bin/entr…" 21 hours ago    Up 21 hours    127.0.0.1:37319->6443/tcp                        kind-control-p
lane
```

← → C   ○ 🗋 localhost:9898

It works!

Problem 4

Run the image httpd again without attaching any volumes

```
manar@manar-VirtualBox:~/linux$ docker run -dit --name apache httpd
0725a645c535839ab9c99de4fb19a54ad7538ad47598b6101b7087eac16b4d4d
```

■Add html static files to the container and make sure they are accessible

```
manar@manar-VirtualBox:~/linux$ docker cp file.html apache:/usr/local/apache2
/htdocs/
Successfully copied 2.05kB to apache:/usr/local/apache2/htdocs/
manar@manar-VirtualBox:~/linux$ docker exec apache ls /usr/local/apache2/htdo
cs/
file.html
index.html
manar@manar-VirtualBox:~/linux$
```

■Commit the container with image name IMAGE_NAME

```
manar@manar-VirtualBox:~/linux$ docker commit apache new_image
sha256:74a50923ab789d5ce395e0db3a0998c2a132ed542eb05f4ebfe5282c50902187
```

■Create a dockerfile for the previous image and build the image from this dockerfile

```
manar@manar-VirtualBox:~/linux$ sudo docker build -t my_image .
[sudo] password for manar:
[+] Building 2.2s (6/6) FINISHED                          docker:defau
t
 => [internal] load build definition from dockerfile              0.
s
 => => transferring dockerfile: 92B                               0.
s
```

```
dockerfile > ...
  1    FROM httpd      The image contains 3 high vulnerabilities
  2
  3    COPY file.html /usr/local/apache2/htdocs/
  4
```

```
PROBLEMS 4    OUTPUT    DEBUG CONSOLE    TERMINAL    ...    bash + ∨  ⊞ 🗑  ...  ∧ ✕

s
 => CACHED [1/2] FROM docker.io/library/httpd:latest              0.0
s
 => [2/2] COPY file.html /usr/local/apache2/htdocs/               0.5
s
 => exporting to image                                            1.1
s
 => => exporting layers                                           0.6
s
 => => writing image sha256:7d2acfba45c151c6082e0acf3747320fb3df0d2  0.0
s
 => => naming to docker.io/library/my_image                       0.0
s
manar@manar-VirtualBox:~/linux$
```

>>Create a volume called mysql_data,

>> then deploy a MySQL database called app-database.

>> Use the mysql latest image,

>> and use the-e flag to setMYSQL_ROOT_PASSWORDtoP4sSw0rd0!.

>>Mount the mysql_data volume to/var/lib/mysql.

>> The container should run in the background.

```
● manar@manar-VirtualBox:~/linux$ docker volume create mysql_data
  mysql_data
○ manar@manar-VirtualBox:~/linux$
```

```
manar@manar-VirtualBox:~/linux$ docker run -d \
--name app-database \
-e MYSQL_ROOT_PASSWORD=P4sSw0rd0! \
-v mysql_data:/var/lib/mysql \
mysql:latest
Unable to find image 'mysql:latest' locally
latest: Pulling from library/mysql
cea172a6e83b: Downloading  18.27MB/49.09MB
fa811e9a869e: Download complete
47a2982daa21: Download complete
634d7076afe3: Download complete
aa8a3958f09f: Download complete
84e4e5ea3754: Download complete
```

```
Status: Downloaded newer image for mysql:latest
61d2cd45634aae36660be18f0c4eefa3ca8774ec965b950af76dfe3078b46d87
```