ASSIGNMENT-2

Q1) Pull any image from the docker hub, create its container, and execute it showing the output.

Ans:

Docker Hub:

Docker Hub is the world's largest repository of container images and it allow us to share container images with our team, customers or with community. It is cloud-based repository that lets us to create, test, store and deploy the container images.

Docker Image:

It is a kind of ready to use software and read-only template crafted with source codes, libraries, dependencies, tools and other files that are needed for the software application to run successfully on any platform or operating system.

Docker container:

It is like a box which has the ability to run the docker images and it can be considered as cohensive software unit that contains code and all its dependencies so that application can run quickly and reliably.

Pulling an image and executing it:

Step 1:

First, we need to check the version of the docker.

```
root@2186cd28402c:/
Microsoft Windows [Version 10.0.22621.1265]
(c) Microsoft Corporation. All rights reserved.
C:\Users\Sahasra\Desktop\Assignment-2>docker version
Client:
Cloud integration: v1.0.29
                    20.10.22
 Version:
 API version:
                    1.41
 Go version:
                    go1.18.9
 Git commit:
                    3a2c30b
                    Thu Dec 15 22:36:18 2022
 Built:
 OS/Arch:
                    windows/amd64
 Context:
                    default
 Experimental:
Server: Docker Desktop 4.16.3 (96739)
  Version:
                    20.10.22
  API version:
                    1.41 (minimum version 1.12)
  Go version:
                    go1.18.9
                    42c8b31
  Git commit:
  Built:
                    Thu Dec 15 22:26:14 2022
  OS/Arch:
                    linux/amd64
 Experimental:
                    false
 containerd:
  Version:
 GitCommit:
                    9ba4b250366a5ddde94bb7c9d1def331423aa323
 runc:
  Version:
  GitCommit:
                    v1.1.4-0-g5fd4c4d
 docker-init:
  Version:
                    0.19.0
  GitCommit:
```

Step 2:

Check whether any container was in running state by using docker ps command.Docker ps command was used to list all the running containers and docker ps -a was used to list all the exited containers.

```
C:\Users\Sahasra\Desktop\HeroviredAss2>docker ps
CONTAINER ID IMAGE COMMAND CREATED STATUS
                                                                                                                              PORTS
                                                                                                                                                     NAMES
C:\Users\Sahasra\Desktop\HeroviredAss2>docker ps -a
                                                                                                                                                                 STATUS
Exited (137) About a minute ago
Exited (0) 2 days ago
Exited (0) 2 days ago
Exited (255) 2 days ago
Exited (255) 2 days ago
Exited (0) 3 days ago
Exited (0) 3 days ago
Exited (0) 4 days ago
Exited (0) 4 days ago
                                                                   viredAss2>docker ps -a

COMMAND

"/bin/bash"

"/hello"

"docker-entrypoint.s..."

"/usr/local/bin/npm ..."

"/usr/local/bin/npm ..."

"/usr/local/bin/npm ..."
CONTAINER ID
264c4e1471a0
                                   IMAGE
                                                                                                                              CREATED
                                                                                                                                                                                                                                                  PORTS
                                                                                                                                                                                                                                                                           NAMES
                                                                                                                               6 minutes ago
                                                                                                                              2 days ago
2 days ago
3 days ago
3 days ago
3 days ago
                                                                                                                                                                                                                                                                           naughty_morse
serene_elgamal
ecstatic_shaw
                                  hello-world
hello-docker
resin/docs
 352ba742406d
05becffebdd6
81a529475779
                                                                                                                                                                                                                                                  3000/tcp
                                 resin/docs
resin/docs
hello-world
2b7dc7ba85d0
0b1ea55f4acf
                                                                                                                                                                                                                                                 3000/tcp
                                                                                                                                                                                                                                                                           distracted_dirac
focused_noether
                                                                      '/hello
 0148267f5064
                                                                                                                                  days ago
                                                                                                                                                                                                                                                                           distracted wing
  2defb61db13
                                                                     "/hello"
                                                                                                                                                                                                                                                                            jolly_ritchie
```

(Still now there is no containers in running state)

Step 3:

Now,we are pulling an image called Ubuntu from Docker Hub with the help of docker pull command.Docker pull command will the download the specified image from public repository(hub.docker.com).

Docker pull <image_name>

```
C:\Users\Sahasra\Desktop\HeroviredAss2>docker pull ubuntu
Using default tag: latest
latest: Pulling from library/ubuntu
Digest: sha256:9a0bdde4188b896a372804be2384015e90e3f84906b750c1a53539b585fbbe7f
Status: Image is up to date for ubuntu:latest
docker.io/library/ubuntu:latest
```

Step 4:

After pulling the image, it doesn't show that image when use command docker container ls. That means we need to create a container for the image that we have pulled.

```
C:\Users\Sahasra\Desktop\HeroviredAss2>docker container ls
 CONTAINER ID
                                                      IMAGE
                                                                                         COMMAND
                                                                                                                           CREATED
                                                                                                                                                               STATUS
                                                                                                                                                                                                  PORTS
                                                                                                                                                                                                                                     NAMES
CONTAINER ID
264c4e1471a0
352ba742406d
                                                      COMMAND
"/bin/bash"
"/hello"
                           IMAGE
                                                                                                     CREATED
                                                                                                                                    STATUS
                                                                                                                                                                                           PORTS
                                                                                                                                                                                                               NAMES
                                                                                                                                   STATUS
Exited (137) 50 minutes ago
Exited (0) 2 days ago
Exited (0) 2 days ago
Exited (255) 2 days ago
Exited (255) 2 days ago
Exited (255) 2 days ago
Exited (0) 3 days ago
Exited (0) 3 days ago
Exited (0) 4 days ago
                          IMAGE
ubuntu
hello-world
hello-docker
resin/docs
                                                                                                    CREATED
55 minutes ago
2 days ago
2 days ago
3 days ago
                                                                                                                                                                                                               sharp_merkle
naughty_morse
serene_elgamal
ecstatic_shaw
                                                       "docker-entrypoint.s..."
"/usr/local/bin/npm ..."
"/usr/local/bin/npm ..."
"/usr/local/bin/npm ..."
 5becffebdd6
                                                                                                                                                                                                                ecstatic_shaw
distracted_dirac
                           resin/docs
                            resin/docs
                                                                                                                                                                                                                focused noether
                           hello-world
hello-world
                                                      "/hello"
"/hello"
                                                                                                                                                                                                               distracted_wing
jolly_ritchie
 e2defb61db13
```

Step 5:

To create a container for the pulled image, we can use docker run command. Docker run command will creates a writeable container layer over the specified image.

Docker run -it -d <image_name>

It will create a container for the specified image

```
C:\Users\Sahasra\Desktop\HeroviredAss2>docker run -it -d ubuntu 232220e62f1183a212f68e46e2284b839b34e4b2467120ef76204cfb44cfe7f2
```

Step 6:

Now,we can see a container with ID 232220e62f11 of ubuntu image was in the running state.We can list the running containers using docker container ls or docker ps command.

docker container ls or docker ps

```
C:\Users\Sahasra\Desktop\HeroviredAss2>docker container ls
                         COMMAND
                                                       STATUS
                                                                       PORTS
CONTAINER ID
               IMAGE
                                       CREATED
                                                                                 NAMES
                         "/bin/bash"
232220e62f11
               ubuntu
                                       8 seconds ago
                                                       Up 7 seconds
                                                                                 priceless_shirley
C:\Users\Sahasra\Desktop\HeroviredAss2>docker ps
                                                        STATUS
                                                                         PORTS
                                                                                   NAMES
CONTAINER ID
               TMAGE
                         COMMAND
                                       CREATED
232220e62f11
                         "/bin/bash"
                                       17 seconds ago
                                                                                   priceless_shirley
               ubuntu
                                                        Up 15 seconds
```

Step 7:

We can execute the container with the help of the command docker exec. Docker exec was used to runs a new command in a running container.

Docker exec -it <container_id> bash

After doing the above command, it will enter into the running container.

```
C:\Users\Sahasra\Desktop\HeroviredAss2>docker exec -it 232220e62f11 bash
root0232220e62f11:/# pwd

/
root0232220e62f11:/# whoami
root
root0232220e62f11:/# cat >file1.txt
hello this is sahasra!!
root0232220e62f11:/# ls
bin boot dev etc file1.txt home lib lib32 lib64 libx32 media mnt opt proc root run sbin srv sys usr var
root0232220e62f11:/# cat file2.txt
hello this is sahasra!!
root02322220e62f11:/# act file1.txt
hello this is sahasra!!
root02322220e62f11:/# touch file2.txt
root02322220e62f11:/# touch file2.txt
root02322220e62f11:/# ls
bin boot dev etc file1.txt file2.txt home lib lib32 lib64 libx32 media mnt opt proc root run sbin srv sys usr var
root0232220e62f11:/# ls
```

```
C:\Users\Sahasra\Desktop\HeroviredAss2>docker ps
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
232220e62f11 ubuntu "/bin/bash" About a minute ago Up About a minute priceless_shirley
```

Step 8:

And we can stop the container using docker stop. Docker stop command will stop the container.

```
C:\Users\Sahasra\Desktop\HeroviredAss2>docker stop 232220e62f11
232220e62f11
```

```
C:\Users\Sahasra\Desktop\HeroviredAss2>docker ps -a
CONTAINER ID IMAGE <u>COMMAND</u>
                                                                                                                                                                                                      STATUS
Exited (137) 5 seconds ago
Exited (137) 52 minutes ago
Exited (0) 2 days ago
Exited (0) 2 days ago
Exited (255) 2 days ago
Exited (255) 2 days ago
Exited (0) 3 days ago
Exited (0) 3 days ago
Exited (0) 3 days ago
Exited (0) 4 days ago
                                                                                                                                                                                                                                                                                                                  NAMES
priceless_shirley
sharp_merkle
naughty_morse
serene_elgamal
ecstatic_shaw
 CONTAINER ID
232220e62f11
264c4e1471a0
                                                                             COMMAND
"/bin/bash"
"/bin/bash"
"/hello"
"docker-entrypoint.s..."
"/usr/local/bin/npm ..."
"/usr/local/bin/npm ..."
"/usr/local/bin/npm ..."
"/hello"
                                                                                                                                                CREATED
                                                                                                                                                                                                                                                                                     PORTS
                                                                                                                                                About a minute ago
57 minutes ago
                                       ubuntu
                                                                                                                                               2 days ago
2 days ago
3 days ago
3 days ago
3 days ago
3 days ago
                                       hello-world
hello-docker
resin/docs
 352ba742406d
 05becffebdd6
81a529475779
                                                                                                                                                                                                                                                                                                                  distracted_dirac
 2b7dc7ba85d0
                                       resin/docs
                                                                                                                                                                                                                                                                                      3000/tcp
                                                                                                                                                                                                                                                                                                                  focused_noether
distracted_wing
 e2defb61db13
                                       hello-world
                                                                                                                                                                                                                                                                                                                   jolly_ritchie
C:\Users\Sahasra\Desktop\HeroviredAss2>
```

Q2) Create the basic java application, generate its image with necessary files, and execute it with docker.

Ans:

Docker Image:

It is a kind of ready to use software and read-only template crafted with source codes, libraries, dependencies, tools and other files that are needed for the software application to run successfully on any platform or operating system.

Docker container:

It is like a box which has the ability to run the docker images and it can be considered as cohensive software unit that contains code and all its dependencies so that application can run quickly and reliably.

Now, we are creating a java application and running by using the docker.

Step 1:

First, we need to check the version of the docker.

```
root@2186cd28402c:/
Microsoft Windows [Version 10.0.22621.1265]
(c) Microsoft Corporation. All rights reserved.
C:\Users\Sahasra\Desktop\Assignment-2>docker version
Client:
 Cloud integration: v1.0.29
 Version:
                    20.10.22
 API version:
                    1.41
                    go1.18.9
 Go version:
                   3a2c30b
 Git commit:
 Built:
                   Thu Dec 15 22:36:18 2022
 OS/Arch:
                    windows/amd64
                    default
 Context:
 Experimental:
                    true
Server: Docker Desktop 4.16.3 (96739)
 Engine:
  Version:
                    20.10.22
                   1.41 (minimum version 1.12)
  API version:
  Go version:
                    go1.18.9
  Git commit:
                    42c8b31
                    Thu Dec 15 22:26:14 2022
  Built:
  OS/Arch:
                   linux/amd64
  Experimental:
                    false
 containerd:
  Version:
                    1.6.14
  GitCommit:
                    9ba4b250366a5ddde94bb7c9d1def331423aa323
 runc:
  Version:
                    1.1.4
  GitCommit:
                    v1.1.4-0-g5fd4c4d
 docker-init:
                    0.19.0
  Version:
  GitCommit:
                    de40ad0
```

Step 2: Creating a directory

Now, we are creating a directory with the name of java-docker-app

```
C:\Users\Sahasra\Desktop\HeroviredAss2>mkdir java-docker-app
C:\Users\Sahasra\Desktop\HeroviredAss2>cd java-docker-app
C:\Users\Sahasra\Desktop\HeroviredAss2\java-docker-app>code .
```

Step 3:

Now,open vscode and open java-docker-app. And now create a new java file Hello.java and also Dockerfile. Dockerfile is a simple text with the set of commands or instructions and it is a script that used the docker platform to generate containers automatically.

Hello.java:

```
class Hello{
    public static void main(String[] args){
        System.out.println("Hello!!!! This is Sahasrakalahasthi");
    }
}
```

```
| File | Edit | Selection | View | Go | Run | Terminal | Help | Colored | File | File
```

Dockerfile:

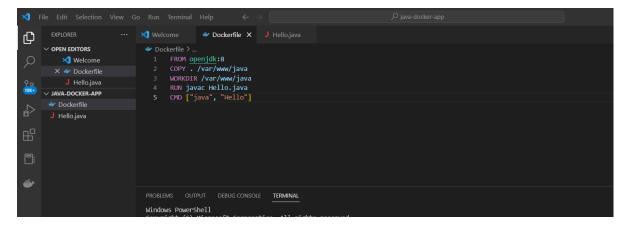
```
FROM openjdk:8

COPY . /var/www/java

WORKDIR /var/www/java

RUN javac Hello.java

CMD ["java", "Hello"]
```



Step 4:

After creating a docker file, we are creating an image by using the command docker build. Docker build will create an image with the name given.

Docker build -t <image_name> .

```
C:\Users\Sahasra\Desktop\HeroviredAss2\java-docker-app>docker build -t java-app .

[+] Building 6.7s (9/9) FINISHED

-> [internal] load build definition from Dockerfile
-> [internal] load build definition from Dockerfile
-> => transferring dockerfile: 137B
-> [internal] load .dockerignore
-> => transferring context: 2B
-> [internal] load metadata for docker.io/library/openjdk:8
-> [internal] load build context
-> => transferring context: 307B
-> CACHED [1/4] FROM docker.io/library/openjdk:8@sha256:86e863cc57215cfb181bd319736d0baf625fe8f150577f9eb58bd937
-> [2/4] COPY ./src/java
-> [3/4] WORKDIR /src/java
-> [4/4] RUN javac Hello.java
-> exporting to image
-> exporting to image
-> exporting to image
-> => writing image sha256:b149b627b58b2a3058839a517002f6ea2672a76a918a03e06804eaac9fb719e7
-> => naming to docker.io/library/java-app
-> 0.05
```

Step 5:

Now, after creating an image successfully, we can run docker by using run command. docker run command will run the java application. It will show the output of the Hello.java file.

```
C:\Users\Sahasra\Desktop\HeroviredAss2\java-docker-app>docker run java-app
Hello!!!! This is Sahasrakalahasthi
```

Here, we can see that after running the java-app it produced an output of "Hello!!!!This is sahasrakalahasthi"

Step 6:

We can list the running containers using docker images or docker container ls.

Docker images or docker container ls

| C:\Users\Sahasra\Desktop\HeroviredAss2\java-docker-app>docker images | | | | |
|--|---------------|--------------|----------------|--------|
| REPOSITORY | TAG | IMAGE ID | CREATED | SIZE |
| java-app | latest | a81815b76095 | 7 minutes ago | 526MB |
| <none></none> | <none></none> | b149b627b58b | 8 minutes ago | 526MB |
| openjdk-app | latest | 4e2bf0a70035 | 12 minutes ago | 526MB |
| openjdk.app | latest | 99b4ad4de415 | 33 hours ago | 526MB |
| <none></none> | <none></none> | ed29087b29f6 | 34 hours ago | 526MB |
| hello-docker | latest | 3692bec15e01 | 2 days ago | 176MB |
| ubuntu | latest | 58db3edaf2be | 3 weeks ago | 77.8MB |
| resin/docs | latest | 592de848a9b7 | 4 months ago | 1.1GB |
| hello-world | latest | feb5d9fea6a5 | 17 months ago | 13.3kB |
| | | | | |