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**B.Tech-Computer Science & Engineering (Sem-VI)**  
**Cloud Computing Lab(20CP322P)**

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**Part A**

**Aim:**

Hands on containerisation using Docker

**Prerequisite:** Nil

**Outcome:**

To impart knowledge of Cloud computing technology

**Theory:**

Docker is a set of platform as a service products that use OS-level virtualization to deliver software in packages called containers. Containers are isolated from one another and bundle their own software, libraries, and configuration files; they can communicate with each other through well-defined channels

**Procedure:**

Install the Docker and run the suggested commands.

**Instructions:**

Go to the official website of docker for downloading the docker engine.  
An online version of the docker can also be referred for the same purpose.

## Part B

### Steps:

- Write procedure here.
- I am using online docker so for that first of all go to <https://labs.play-with-docker.com/> and make your account with docker.
- Here I am downloading MySQL docker image.
- So first of all, for finding images on docker Hub type “docker search MySQL”. And you will get all the available images on docker Hub which include MySQL in their name.
- To download any image from docker Hub type “docker pull” and the image name. To download any image.
- For downloading MySQL, I have used “docker pull --platform linux/x86\_64 mysql”
- To view all the available downloaded image type “docker images”.
- To view all the running docker container type “docker ps” and for viewing all running and stopped docker container type “docker ps --all”.
- To start any container type “docker run”. To get additional information about "run" command type “docker run --help”. To start MySQL I have typed “docker run --env MYSQL\_ROOT\_PASSWORD=my-secret-pw --detach mysql”.
- To stop any docker container type “docker stop” and then container ID. One can find docker container ID in “docker ps” command.
- To restart any docker container type “docker restart” and then container ID.
- To rename any docker container type “docker rename” then old name then spaces the new name.
- To execute something in docker container type “docker exec” then some tags if you want to use then container name then command. If you want find more about tags type “docker exec --help”.
- To find logs of docker container type “docker logs” then container name.
- To delete any container type “docker rm” then docker container name.
- To delete any docker image type “docker rmi” then docker image ID. You can find all docker images ID in “docker images” command

# Output:

```
#####
# WARNING!!!! #
# This is a sandbox environment. Using personal credentials #
# is HIGHLY! discouraged. Any consequences of doing so are #
# completely the user's responsibilities. #
# #
# The PWD team. #
#####
[node1] (local) root@192.168.0.18 ~
$ docker search MySQL
NAME                                DESCRIPTION                                STARS     OFFICIAL   AUTOMATED
mysql                               MySQL is a widely used, open-source relation... 12069     [OK]
mariadb                             MariaDB Server is a high performing open sou... 4626     [OK]
mysql/mysql-server                  Optimized MySQL Server Docker images. Create... 903
centos/mysql-57-centos7            MySQL 5.7 SQL database server                92
mysql/mysql-cluster                 Experimental MySQL Cluster Docker images. Cr... 92
centurylink/mysql                  Image containing mysql. Optimized to be link... 59
database/mysql-backup               Back up mysql databases to... anywhere!        54
prom/mysqld-exporter                [REDACTED]                                     46
deitch/mysql-backup                 [REDACTED]                                     40
tutum/mysql                         Base docker image to run a MySQL database se... 35
```

```
[node1] (local) root@192.168.0.18 ~
$ docker pull --platform linux/x86_64 mysql
Using default tag: latest
latest: Pulling from library/mysql
6552179c3509: Pull complete
d69aa66e4482: Pull complete
3b19465b002b: Pull complete
7b0d0cfe99a1: Pull complete
9ccd5a5c8987: Pull complete
2dab00d7d232: Pull complete
64d3afdccd4a: Pull complete
82148d50b16c: Pull complete
8bb7d73a7d0c: Pull complete
74778cd68a75: Pull complete
d7e5f9309140: Pull complete
f2e376ecd59f: Pull complete
Digest: sha256:92d27b8222bbcf53bc42c70ca7cd1010d6c0527efc61f14980ce77c50932bef4
Status: Downloaded newer image for mysql:latest
docker.io/library/mysql:latest
[node1] (local) root@192.168.0.18 ~
$
```

```
6552179c3509: Pull complete
d69aa66e4482: Pull complete
3b19465b002b: Pull complete
7b0d0cfe99a1: Pull complete
9ccd5a5c8987: Pull complete
2dab00d7d232: Pull complete
64d3afdccd4a: Pull complete
82148d50b16c: Pull complete
8bb7d73a7d0c: Pull complete
74778cd68a75: Pull complete
d7e5f9309140: Pull complete
f2e376ecd59f: Pull complete
Digest: sha256:92d27b8222bbcf53bc42c70ca7cd1010d6c0527efc61f14980ce77c50932bef4
Status: Downloaded newer image for mysql:latest
docker.io/library/mysql:latest
[node1] (local) root@192.168.0.18 ~
$ docker images
REPOSITORY    TAG       IMAGE ID       CREATED        SIZE
mysql         latest   d1dc36cf8d9e   11 days ago   519MB
[node1] (local) root@192.168.0.18 ~
$
```

```
82148d50b16c: Pull complete
8bb7d73a7d0c: Pull complete
74778cd68a75: Pull complete
d7e5f9309140: Pull complete
f2e376ecd59f: Pull complete
Digest: sha256:92d27b8222bbcf53bc42c70ca7cd1010d6c0527efc61f14980ce77c50932bef4
Status: Downloaded newer image for mysql:latest
docker.io/library/mysql:latest
[node1] (local) root@192.168.0.18 ~
$ docker images
REPOSITORY TAG IMAGE ID CREATED SIZE
mysql latest d1dc36cf8d9e 11 days ago 519MB
[node1] (local) root@192.168.0.18 ~
$ docker run --env MYSQL_ROOT_PASSWORD=my-secret-pw --detach mysql
037e5f044487b52ea7dd57b82c11bb647ae494f35e85d21ae480cc27af340ff3
[node1] (local) root@192.168.0.18 ~
$ docker ps --all
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
037e5f044487 mysql "docker-entrypoint.s..." About a minute ago Up 40 seconds 3306/tcp, 33060/tcp peaceful_wilbur
[node1] (local) root@192.168.0.18 ~
$
```

```
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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> SHOW DATABASES;
+-----+
| Database |
+-----+
| information_schema |
| mysql |
| performance_schema |
| sys |
+-----+
4 rows in set (0.05 sec)

mysql>
```

```
+-----+
| Database |
+-----+
[node1] (local) root@192.168.0.18 ~
$ docker logs test_db
2022-02-07 15:32:17+00:00 [Note] [Entrypoint]: Entrypoint script for MySQL Server 8.0.28-1debian10 started.
2022-02-07 15:32:19+00:00 [Note] [Entrypoint]: Switching to dedicated user 'mysql'
2022-02-07 15:32:20+00:00 [Note] [Entrypoint]: Entrypoint script for MySQL Server 8.0.28-1debian10 started.
2022-02-07 15:32:20+00:00 [Note] [Entrypoint]: Initializing database files
2022-02-07T15:32:20.913097Z 0 [System] [MY-013169] [Server] /usr/sbin/mysqld (mysqld 8.0.28) initializing of server in progress as process 42
2022-02-07T15:32:20.953095Z 1 [System] [MY-013576] [InnoDB] InnoDB initialization has started.
2022-02-07T15:33:27.378763Z 1 [System] [MY-013577] [InnoDB] InnoDB initialization has ended.
2022-02-07T15:34:59.126511Z 6 [Warning] [MY-010453] [Server] root@localhost is created with an empty password ! Please consider switching off the --initialize-insecure option.
2022-02-07 15:35:22+00:00 [Note] [Entrypoint]: Database files initialized
2022-02-07 15:35:22+00:00 [Note] [Entrypoint]: Starting temporary server
2022-02-07T15:35:24.135684Z 0 [System] [MY-010116] [Server] /usr/sbin/mysqld (mysqld 8.0.28) starting as process 91
2022-02-07T15:35:24.492668Z 1 [System] [MY-013576] [InnoDB] InnoDB initialization has started.
2022-02-07T15:35:26.285837Z 1 [System] [MY-013577] [InnoDB] InnoDB initialization has ended.
2022-02-07T15:35:29.402024Z 0 [Warning] [MY-010068] [Server] CA certificate ca.pem is self signed.
2022-02-07T15:35:29.402269Z 0 [System] [MY-013602] [Server] Channel mysql_main configured to support TLS. Encrypted connections are now
```

```
2022-02-07T15:36:16.141994Z 10 [System] [MY-013172] [Server] Received SHUTDOWN from user root. Shutting down mysqld (Version: 8.0.28).
[node1] (local) root@192.168.0.18 ~
$ docker stop test_db
test_db
[node1] (local) root@192.168.0.18 ~
$ docker rm test_db
test_db
[node1] (local) root@192.168.0.18 ~
$ docker rmi d1dc36cf8d9e
Untagged: mysql:latest
Untagged: mysql@sha256:92d27b8222bbcf53bc42c70ca7cd1010d6c0527efc61f14980ce77c50932bef4
Deleted: sha256:d1dc36cf8d9e8092bb3ea41ddcaeb81f7d60ec58bd867f3d3260a6159326cb5
Deleted: sha256:4cb2998bd5a8855efd835fcb379f102fe5cef99e2a5e276cd7fa0bb98b1fd9a
Deleted: sha256:d1ed5099967ce115f9b849082f4ee6c43cfdbf543f0558d75f075f7952f94864
Deleted: sha256:1639a7b172854e04084a5e3be1d1a9a172bea37c00bb94306bc45f472d777eff
Deleted: sha256:4b6240d5ca5ebcfadbbab1b9d6f0bf29e7636a8703d21e8eff947b1dcca421ca8
Deleted: sha256:358d256cc8b7230c898e75d962d565039421005f65423648f8eaae0edd64d4a8
Deleted: sha256:cc52a9bf425c2e84f49114e668a6fcb63acc8532d87bf8b4641c962c4800a6
Deleted: sha256:156aala11e93325c2fc2303736d7902a0be9ad4b29d30561ab6b12050ad12f46
Deleted: sha256:6a4d005549c580ebf87f192fcdcfb1c9df91f4ff6b934d284c9cb49f2af13fd5
Deleted: sha256:59fc12d50d81beac733e8069de09b0d8f05f518783076d0a11082fff76535355
```

## **Observation & Learning:**

In this practical, We understand basic working of Docker. For this learning purpose we first installed from goggle and setup in your device and learn basic working of Docker

## **Conclusion:**

Docker is a revolutionary technology that simplifies isolation and provides environment independency, but due to it complexity I would not recommend using Docker in production applications yet, as it requires a bit more experience.

## **Questions:**

### **1. What is the difference between the docker and VMware?**

VMware emulates machine hardware whereas Docker emulates the operating system in which your application runs. Docker is a much more lightweight virtualization technology since it does not have to emulate server hardware resources.

### **2. Where is the docker images located?**

Docker images get stored in the Docker Hub cloud registry service, from which users can deploy containers and test and share images.

### **3. What do you mean by the term container?**

Containers are packages of software that contain all of the necessary elements to run in any environment.