Exercise Worksheet

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From the Course:
Understanding Docker Run, Dockerfile, Docker-Compose for Beginners

Databases and Data Persistence in Host-Volume Mounted Directories in Docker Step by Step

In the previous example we were spinning up our database with our web-app. But docker containers are ephemeral. This means they are losing all data once removed and re-started. So, somehow, we must find a way to make data persistent if we want to keep it.

Use this docker-compose.yml file:

```yaml
version: '3'

services:
  db:
    image: mysql:latest
    restart: always
    container_name: myphpapp-db
    environment:
       MYSQL_ROOT_PASSWORD: somepass
       MYSQL_DATABASE: somedatabase

  dbclient:
    image: mysql:latest
    depends_on:
      - db
    command: mysql -uroot -psomepass -hdb
```

- MYSQL_DATABASE will create an empty database with the name “somedatabase” at first spin-up
- depends_on waits for the container to start on the other containers

Run the command:

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

- starts both containers in detached mode

```
docker-compose ps
```

- will show the “db” running, while the other one stopped

```
docker-compose run --rm dbclient
```

- should connect to the “db” and open a mariadb shell

Enter the following SQL queries:

```
USE somedatabase;

SHOW TABLES;
```

Observe that it's empty!

```
CREATE TABLE mytable (id INT);

SHOW TABLES;
```

Now you have one table in your database, which we created.

Exit the console with

```
exit;
```

Now stop the container:

```
docker-compose stop
```

and remove the containers

```
docker-compose rm
```

- removes all (not running) containers from docker-compose

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

- Re-Run the containers based on the images
- Only the database container is running

Login to the mysql shell again:

```
docker-compose run --rm dbclient

USE somedatabase;

SHOW TABLES;
```

Observe it's empty again.

```
exit;

docker-compose stop

docker-compose rm
```

- Stop and remove the containers before we continue

So, how can we make data persistent, even we remove the containers? With volumes and a host-mounted data directory.

```
mkdir data
```

- Create a new "data" directory on the host

And add a volumes key to your docker-compose.yml file:

```
version: '3'

services:
  db:
    image: mysql:latest
    restart: always
    container_name: myphpapp-db
    environment:
       MYSQL_ROOT_PASSWORD: somepass
       MYSQL_DATABASE: somedatabase
    volumes:
      - ./data:/var/lib/mysql

  dbclient:
    image: mysql:latest
    depends_on:
      - db
    command: mysql -uroot -psomepass -hdb
```

Now start the db service:

```
docker-compose db -d up
```

- Observe the data directory, it gets populated with data

We can now also enter the container. Recreate the table:

```
docker-compose run --rm dbclient

USE somedatabase;

SHOW TABLES;
```

Then create the table, because it is empty right now.

```
CREATE TABLE mytable (id INT);

SHOW TABLES;
```

And then exit and stop and remove the container:

```
exit;

docker-compose stop

docker-compose rm
```

Now spin up the db container again:

```
docker-compose up -d db
```

Then login to the mysql client:

```
docker-compose run --rm dbclient

USE somedatabase;

SHOW TABLES;
```

Observe the database is now persistent. But maybe writing on the host into a directory is not the best solution in this case. Maybe a named volume would be better…