■ TP04: Docker

Objective

This lab focuses on creating and managing Docker images and containers. You will build a Docker image from your previous TP03 project, upload it to Docker Hub, and deploy multiple containers connected through a Docker network.

1■■ Create a Docker Hub Account

Go to https://hub.docker.com and create a new account if you don't already have one.

2■■ Create a Docker Image for TP03

Use your TP03 project (Python + Power BI integration) as the base. Create a Dockerfile in your project directory:

```
FROM python:3.9
WORKDIR /app
COPY . /app
RUN pip install -r requirements.txt
CMD ["python", "main.py"]
```

Build the image:

```
docker build -t tp03-image .
```

3■■ Push the Image to Docker Hub

```
docker login
docker tag tp03-image your_dockerhub_username/tp03-image:v1
docker push your_dockerhub_username/tp03-image:v1
```

4■■ Pull the Uploaded Image from Docker Hub

```
docker pull your_dockerhub_username/tp03-image:v1
```

5■■ Create Three Containers from the Downloaded Image

```
docker run -d --name container1 your_dockerhub_username/tp03-image:v1
docker run -d --name container2 your_dockerhub_username/tp03-image:v1
docker run -d --name container3 your_dockerhub_username/tp03-image:v1
```

6■■ Create a Network to Connect the Containers

```
docker network create tp-network
docker network connect tp-network container1
docker network connect tp-network container2
docker network connect tp-network container3
```

7■■ Run and Map Ports Between Host and Containers

```
docker run -d -p 8001:80 --name container1 your_dockerhub_username/tp03-image:v1
docker run -d -p 8002:80 --name container2 your_dockerhub_username/tp03-image:v1
docker run -d -p 8003:80 --name container3 your_dockerhub_username/tp03-image:v1
```

8■■ Verify the Containers are Running

```
docker ps
```
You should see the three containers running, each mapped to different ports.

■ Expected Outcome

At the end of this lab, you should have:
- A Docker Hub account with a published image.
- Three containers running from the same image.
- A Docker network connecting all containers.
- Working port mappings between the host and containers.