

INTRODUCCION A DOCKER

Present: Margerys Salgado

PRACTICA

First Container

```
C:\Windows\system32>docker run hello-world

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)
3. The Docker daemon created a new container from that image which runs the
   executable that produces the output you are currently reading.
4. The Docker daemon streamed that output to the Docker client, which sent it
   to your terminal.

To try something more ambitious, you can run an Ubuntu container with:
$ docker run -it ubuntu bash

Share images, automate workflows, and more with a free Docker ID:
https://hub.docker.com/

For more examples and ideas, visit:
https://docs.docker.com/get-started/
```

Second Container

```
C:\Windows\system32>docker pull busybox
Using default tag: latest
latest: Pulling from library/busybox
Digest: sha256:f7ca5a32c10d51aeda3b4d01c61c6061f497893d7f6628b92f822f7117182a57
Status: Image is up to date for busybox:latest
docker.io/library/busybox:latest
```

Checking Images

```
C:\Windows\system32>docker images
```

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
mysql	5.7.35	8a8a506ccfdc	7 days ago	448MB
jupyter/base-notebook	latest	f14b646c836f	8 days ago	668MB
hello-world	latest	feb5d9fea6a5	3 weeks ago	13.3kB
busybox	latest	16ea53ea7c65	5 weeks ago	1.24MB

Running Your Second Container

```
C:\Windows\system32>docker run busybox

C:\Windows\system32>docker run busybox echo "Hola Margerys"
Hola Margerys
```

Check Running Containers

```
C:\Windows\system32>docker ps -a
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
330d2d6f37eb	busybox	"echo 'Hola Margerys'"	4 minutes ago	Exited (0) 4 minutes ago		distracted_poitras
970057205c14	busybox	"sh"	5 minutes ago	Exited (0) 5 minutes ago		vigilant_antonelli
6fedb23b27b2	hello-world	"/hello"	2 hours ago	Exited (0) 2 hours ago		naughty_haibt
da8d1713c051	hello-world	"/hello"	2 hours ago	Exited (0) 2 hours ago		recursing_satoshi
34744a7d08c6	hello-world	"/hello"	3 hours ago	Exited (0) 3 hours ago		youthful_cori
0faa953d1468	mysql:5.7.35	"docker-entrypoint.s..."	4 days ago	Created		charming_sanderson
eade5eb57345	mysql:5.7.35	"docker-entrypoint.s..."	4 days ago	Created		affectionate_poincare
446eb6ac258e	mysql:5.7.35	"docker-entrypoint.s..."	4 days ago	Created		busy_shamir
47b5d7988081	mysql:5.7.35	"docker-entrypoint.s..."	4 days ago	Exited (0) 4 days ago		focused_perlman

```
~ # exit
```

Run and get inside the container

```
C:\Windows\system32>docker run -it busybox sh
/# ls
bin dev etc home proc root sys tmp usr var
/# uptime
17:29:37 up 3:30, 0 users, load average: 0.00, 0.00, 0.67
/# cd home/
/home # ls
/home # cd
~ # cd..
sh: cd.: not found
~ # cd
~ # cd ..
/# cd var/
/var # ls
spool www
/var # cd
~ # clear
~ # exit
```

Delete Containers

```
C:\Windows\system32>docker rm 0faa953d1468 eade5eb57345 446eb6ac258e 47b5d7988081 c8ea1af4943e 8357c9b1919e 066f8c38be9d c9b12d1c11e0
0faa953d1468
eade5eb57345
446eb6ac258e
47b5d7988081
c8ea1af4943e
8357c9b1919e
066f8c38be9d
c9b12d1c11e0
```

DOCKER AND PYTHON

```
C:\Windows\system32>docker pull jupyter/base-notebook
Using default tag: latest
latest: Pulling from jupyter/base-notebook
7b1a6ab2e44d: Pull complete
392a878eec6b: Pull complete
dde1fa497bf5: Pull complete
9616edd90194: Pull complete
bbb1a4bc9d68: Pull complete
deaf0ecf3c73: Pull complete
0e8c9d924ea1: Pull complete
efd43a977977: Pull complete
2d53f8fc7117: Pull complete
b4fc3845e346: Pull complete
ee1b4ffdac09: Pull complete
Digest: sha256:b31e71a1055a8a7d2e3fda9f12ae234fc128b7d1d123379b9866b09193a6772f
Status: Downloaded newer image for jupyter/base-notebook:latest
docker.io/jupyter/base-notebook:latest
```

RUN JUPYTER CONTAINER

Maqueo del puerto

```
C:\Windows\system32>docker run -p 8888:8888 jupyter/base-notebook
WARN: Jupyter Notebook deprecation notice https://github.com/jupyter/docker-stacks#jupyter-notebook-deprecation-notice.
Executing the command: jupyter notebook
[I 17:56:07.541 NotebookApp] Writing notebook server cookie secret to /home/jovyan/.local/share/jupyter/runtime/notebook_cookie_secret
[W 2021-10-19 17:56:08.035 LabApp] 'ip' has moved from NotebookApp to ServerApp. This config will be passed to ServerApp. Be sure to update your config before our next release.
[W 2021-10-19 17:56:08.035 LabApp] 'port' has moved from NotebookApp to ServerApp. This config will be passed to ServerApp. Be sure to update your config before our next release.
[W 2021-10-19 17:56:08.035 LabApp] 'port' has moved from NotebookApp to ServerApp. This config will be passed to ServerApp. Be sure to update your config before our next release.
[W 2021-10-19 17:56:08.035 LabApp] 'port' has moved from NotebookApp to ServerApp. This config will be passed to ServerApp. Be sure to update your config before our next release.
[I 2021-10-19 17:56:08.043 LabApp] JupyterLab extension loaded from /opt/conda/lib/python3.9/site-packages/jupyterlab
[I 2021-10-19 17:56:08.043 LabApp] JupyterLab application directory is /opt/conda/share/jupyterlab
[I 17:56:08.048 NotebookApp] Serving notebooks from local directory: /home/jovyan
[I 17:56:08.048 NotebookApp] Jupyter Notebook 6.4.4 is running at:
[I 17:56:08.048 NotebookApp] http://ee8c8551901b:8888/?token=8701171f7d10485f96c7df8a75c2a9b5f3f0153302d14ed7
[I 17:56:08.048 NotebookApp] or http://127.0.0.1:8888/?token=8701171f7d10485f96c7df8a75c2a9b5f3f0153302d14ed7
[I 17:56:08.048 NotebookApp] Use Control-C to stop this server and shut down all kernels (twice to skip confirmation).
[C 17:56:08.053 NotebookApp]

To access the notebook, open this file in a browser:
file:///home/jovyan/.local/share/jupyter/runtime/nbserver-7-open.html
Or copy and paste one of these URLs:
http://ee8c8551901b:8888/?token=8701171f7d10485f96c7df8a75c2a9b5f3f0153302d14ed7
or http://127.0.0.1:8888/?token=8701171f7d10485f96c7df8a75c2a9b5f3f0153302d14ed7
```

TOKEN: <http://127.0.0.1:8888/?token=8701171f7d10485f96c7df8a75c2a9b5f3f0153302d14ed7>

Home x Untitled - Jupyter Notebook x +

← → ↺ 127.0.0.1:8888/notebooks/Untitled.ipynb?kernel_name=python3

Aplicaciones Gmail YouTube Maps Traducir Make Sense

jupyter Untitled (unsaved changes) Logout

File Edit View Insert Cell Kernel Help Trusted Python 3 (ipykernel)

Run Save Copy Paste Undo Redo Up Down Play Run Code

```
### Practica en el contenedor de Python

In [1]: !python --version
Python 3.9.7

In [2]: print("Hello Margerys")
Hello Margerys

In [ ]:

In [ ]:
```

Create a Network

```
C:\Windows\system32>docker network create --driver bridge my_another_network
b837e3ca5a753b814293a153ed61a081867d0e015ec1f24939534d3cb5677a14
```

RUN MYSQL CONTAINER

```
C:\Windows\system32>docker run -it --network my_another_network -e "MYSQL_ROOT_PASSWORD=root123" -e "MYSQL_DATABASE=test" -e "MYSQL_USER=test" -e "MYSQL_PASSWORD=test123" mysql:5.7.35
2021-10-19 18:30:59+00:00 [Note] [Entrypoint]: Entrypoint script for MySQL Server 5.7.35-1debian10 started.
2021-10-19 18:30:59+00:00 [Note] [Entrypoint]: Switching to dedicated user 'mysql'
2021-10-19 18:30:59+00:00 [Note] [Entrypoint]: Entrypoint script for MySQL Server 5.7.35-1debian10 started.
2021-10-19 18:30:59+00:00 [Note] [Entrypoint]: Initializing database files
2021-10-19T18:30:59.548451Z 0 [Warning] TIMESTAMP with implicit DEFAULT value is deprecated. Please use --explicit_defaults_for_timestamp server option (see documentation for more details).
2021-10-19T18:30:59.665028Z 0 [Warning] InnoDB: New log files created, LSN=45790
2021-10-19T18:30:59.696281Z 0 [Warning] InnoDB: Creating foreign key constraint system tables.
2021-10-19T18:30:59.704673Z 0 [Warning] No existing UUID has been found, so we assume that this is the first time that this server has been started. Generating a new UUID: b4f53935-310a-11ec-b08c-0242ac130002.
2021-10-19T18:30:59.707092Z 0 [Warning] Gtid table is not ready to be used. Table 'mysql.gtid_executed' cannot be opened.
2021-10-19T18:31:00.280544Z 0 [Warning] A deprecated TLS version TLSv1 is enabled. Please use TLSv1.2 or higher.
2021-10-19T18:31:00.280587Z 0 [Warning] A deprecated TLS version TLSv1.1 is enabled. Please use TLSv1.2 or higher.
2021-10-19T18:31:00.281074Z 0 [Warning] CA certificate ca.pem is self signed.
2021-10-19T18:31:00.577814Z 1 [Warning] root@localhost is created with an empty password ! Please consider switching off the --initialize-insecure option.
2021-10-19 18:31:02+00:00 [Note] [Entrypoint]: Database files initialized
```

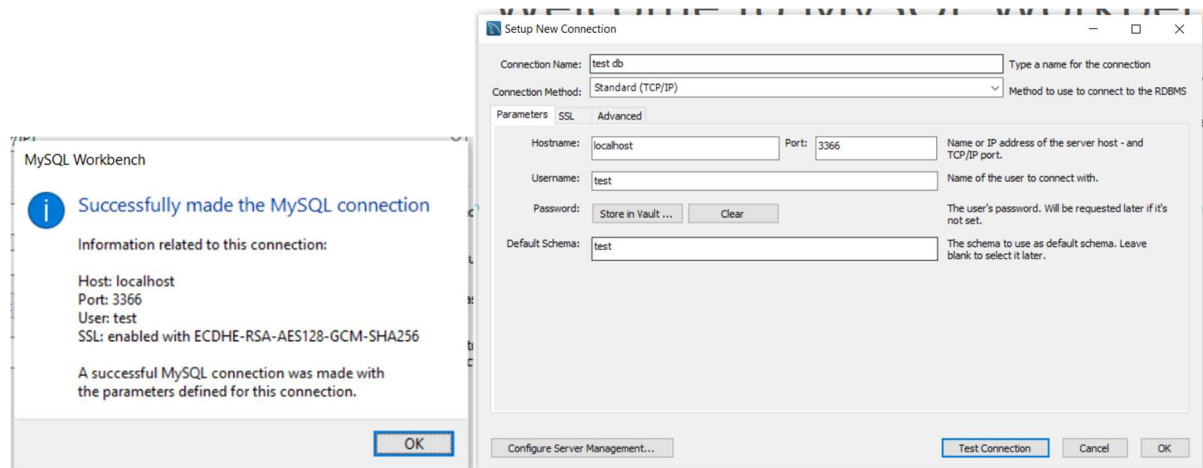
Comprobar que se está ejecutando

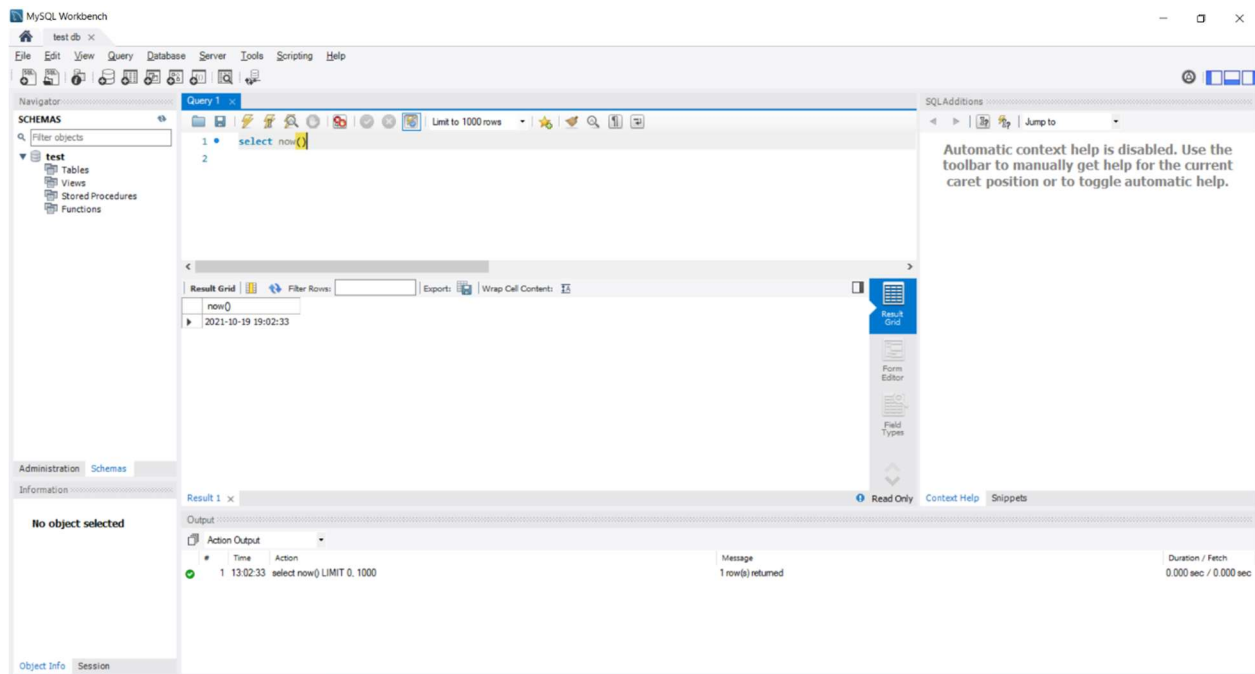
```
C:\Windows\system32>docker ps
CONTAINER ID   IMAGE      COMMAND                  CREATED        STATUS        PORTS                               NAMES
d45144992e50   mysql:5.7.35 "docker-entrypoint.s..." 2 minutes ago  Up About a minute  3306/tcp, 33060/tcp               focused_ishizaka
```

Mapear puerto MYSQL

```
C:\Windows\system32>docker run -it --network my_another_network -e "MYSQL_ROOT_PASSWORD=root123" -e "MYSQL_DATABASE=test" -e "MYSQL_USER=test" -e "MYSQL_PASSWORD=test123" -p 3366:3306 mysql:5.7.35
2021-10-19 18:44:12+00:00 [Note] [Entrypoint]: Entrypoint script for MySQL Server 5.7.35-1debian10 started.
2021-10-19 18:44:12+00:00 [Note] [Entrypoint]: Switching to dedicated user 'mysql'
2021-10-19 18:44:12+00:00 [Note] [Entrypoint]: Entrypoint script for MySQL Server 5.7.35-1debian10 started.
2021-10-19 18:44:12+00:00 [Note] [Entrypoint]: Initializing database files
2021-10-19T18:44:12.302466Z 0 [Warning] TIMESTAMP with implicit DEFAULT value is deprecated. Please use --explicit_defaults_for_timestamp server option (see documentation for more details).
2021-10-19T18:44:12.405592Z 0 [Warning] InnoDB: New log files created, LSN=45790
2021-10-19T18:44:12.430490Z 0 [Warning] InnoDB: Creating foreign key constraint system tables.
2021-10-19T18:44:12.438580Z 0 [Warning] No existing UUID has been found, so we assume that this is the first time that this server has been started. Generating a new UUID: 8d76d1be-310c-11ec-8c61-0242ac130002.
2021-10-19T18:44:12.440492Z 0 [Warning] Gtid table is not ready to be used. Table 'mysql.gtid_executed' cannot be opened.
2021-10-19T18:44:13.127791Z 0 [Warning] A deprecated TLS version TLSv1 is enabled. Please use TLSv1.2 or higher.
2021-10-19T18:44:13.127817Z 0 [Warning] A deprecated TLS version TLSv1.1 is enabled. Please use TLSv1.2 or higher.
2021-10-19T18:44:13.128131Z 0 [Warning] CA certificate ca.pem is self signed.
2021-10-19T18:44:13.287927Z 1 [Warning] root@localhost is created with an empty password ! Please consider switching off the --initialize-insecure option.
2021-10-19 18:44:15+00:00 [Note] [Entrypoint]: Database files initialized
```

Conexión con MYSQL





Run Jupyter with Network

```
C:\Windows\system32>docker run -p 8888:8888 --network my_another_network jupyter/base-notebook
WARN: Jupyter Notebook deprecation notice https://github.com/jupyter/docker-stacks#jupyter-notebook-deprecation-notice.
Executing the command: jupyter notebook
[I 21:31:21.599 NotebookApp] Writing notebook server cookie secret to /home/jovyan/.local/share/jupyter/runtime/notebook_cookie_secret
[W 2021-10-19 21:31:22.046 LabApp] 'ip' has moved from NotebookApp to ServerApp. This config will be passed to ServerApp. Be sure to update your config before our next release.
[W 2021-10-19 21:31:22.046 LabApp] 'port' has moved from NotebookApp to ServerApp. This config will be passed to ServerApp. Be sure to update your config before our next release.
[W 2021-10-19 21:31:22.046 LabApp] 'port' has moved from NotebookApp to ServerApp. This config will be passed to ServerApp. Be sure to update your config before our next release.
[W 2021-10-19 21:31:22.046 LabApp] 'port' has moved from NotebookApp to ServerApp. This config will be passed to ServerApp. Be sure to update your config before our next release.
[I 2021-10-19 21:31:22.055 LabApp] JupyterLab extension loaded from /opt/conda/lib/python3.9/site-packages/jupyterlab
[I 2021-10-19 21:31:22.055 LabApp] JupyterLab application directory is /opt/conda/share/jupyter/lab
[I 21:31:22.059 NotebookApp] Serving notebooks from local directory: /home/jovyan
[I 21:31:22.059 NotebookApp] Jupyter Notebook 6.4.4 is running at:
[I 21:31:22.060 NotebookApp] http://5f69aae7a1b2:8888/?token=5585fb2a486d706d546188449143d0c601d85a3016a95a29
[I 21:31:22.060 NotebookApp] or http://127.0.0.1:8888/?token=5585fb2a486d706d546188449143d0c601d85a3016a95a29
[I 21:31:22.060 NotebookApp] Use Control-C to stop this server and shut down all kernels (twice to skip confirmation).
[C 21:31:22.064 NotebookApp]

To access the notebook, open this file in a browser:
file:///home/jovyan/.local/share/jupyter/runtime/nbserver-7-open.html
Or copy and paste one of these URLs:
http://5f69aae7a1b2:8888/?token=5585fb2a486d706d546188449143d0c601d85a3016a95a29
or http://127.0.0.1:8888/?token=5585fb2a486d706d546188449143d0c601d85a3016a95a29
```

TOKEN: <http://127.0.0.1:8888/?token=5585fb2a486d706d546188449143d0c601d85a3016a95a29>

Check Running Containers

```
C:\Windows\system32>docker ps
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS                               NAMES
ffe31fac86d6   mysql:5.7.35   "docker-entrypoint.s..." 3 minutes ago  Up 3 minutes  33060/tcp, 0.0.0.0:3366->3306/tcp  hungry_booth

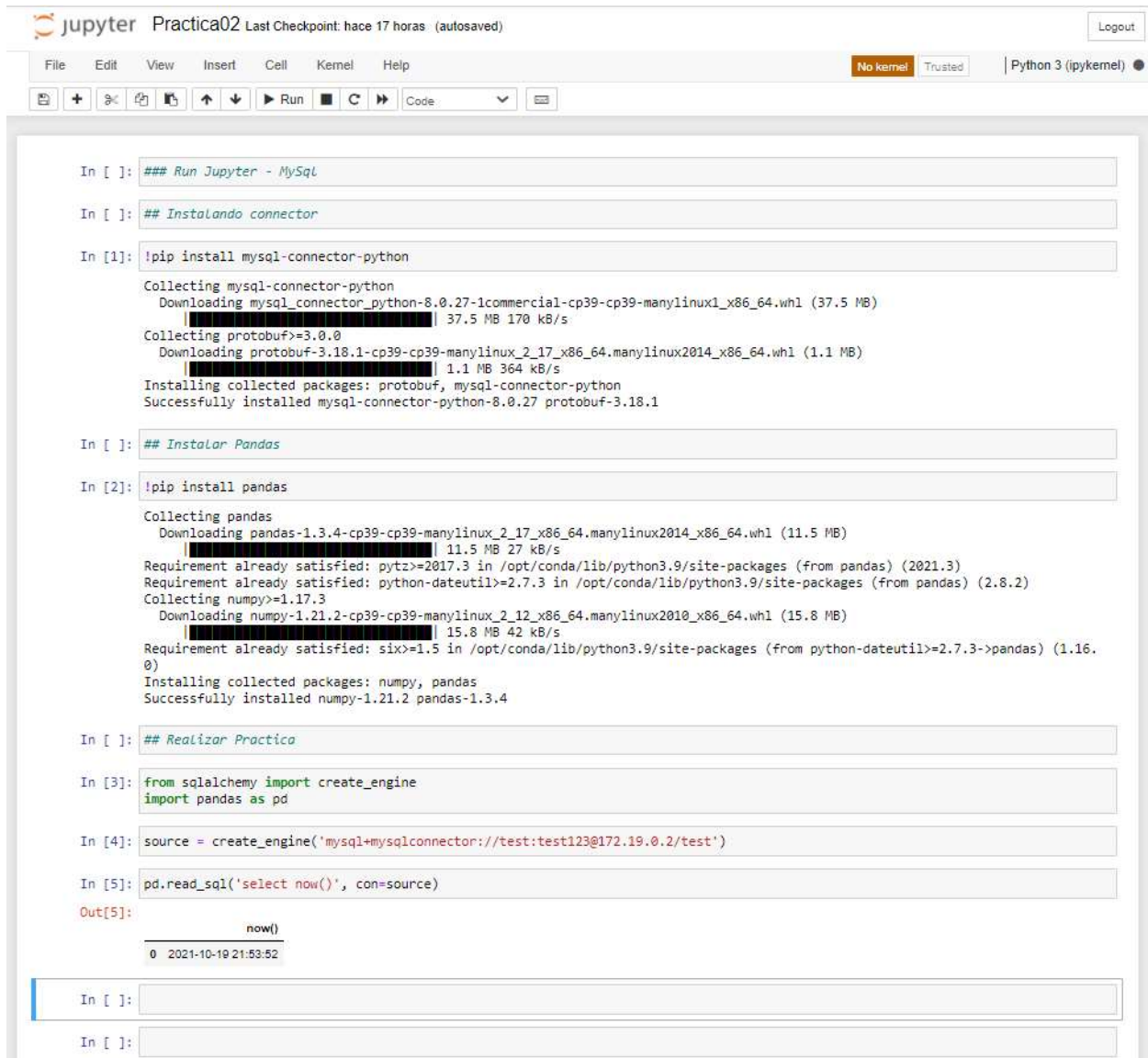
C:\Windows\system32>docker ps
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS                               NAMES
5f69aae7a1b2   jupyter/base-notebook "tini -g -- start-no..." 4 minutes ago  Up 4 minutes  0.0.0.0:8888->8888/tcp             eloquent_robinson
ffe31fac86d6   mysql:5.7.35   "docker-entrypoint.s..." 3 hours ago    Up 3 hours    33060/tcp, 0.0.0.0:3366->3306/tcp  hungry_booth
```

Inspeccionar los IP de las redes

```
C:\Windows\system32>docker inspect network my_another_network
[
  {
    "Name": "my_another_network",
    "Id": "b837e3ca5a753b814293a153ed61a081867d0e015ec1f24939534d3cb5677a14",
    "Created": "2021-10-19T18:24:34.6742338Z",
    "Scope": "local",
    "Driver": "bridge",
    "EnableIPv6": false,
    "IPAM": {
      "Driver": "default",
      "Options": {},
      "Config": [
        {
          "Subnet": "172.19.0.0/16",
          "Gateway": "172.19.0.1"
        }
      ]
    },
    "Internal": false,
    "Attachable": false,
    "Ingress": false,
    "ConfigFrom": {
      "Network": ""
    },
    "ConfigOnly": false,
    "Containers": {
      "5f69aae7a1b273f724751366bea218f1204bdcfe172f2079414bd9e2d9ef2baa": {
        "Name": "eloquent_robinson",
        "EndpointID": "1bcb1275c4fc5197b475f4f7233b2e4a1d7bcbb4bd966e47b72f44ebfd1f63b0",
        "MacAddress": "02:42:ac:13:00:03",
        "IPv4Address": "172.19.0.3/16",
        "IPv6Address": ""
      },
      "ffe31fac86d64b686b56075fbce03e8a9039baec02bf4c0c56a69a6a020bd947": {
        "Name": "hungry_booth",
        "EndpointID": "5ce23a4b5b9de94cde70ae18f8a3b152673a563c2e9302bfa5104fae1c29a4ad",
        "MacAddress": "02:42:ac:13:00:02",
        "IPv4Address": "172.19.0.2/16",
        "IPv6Address": ""
      }
    },
    "Options": {},
    "Labels": {}
  }
]
Error: No such object: network
```

ACCESSING JUPYTER - MYSQL CONTAINER

Test our connection



The screenshot shows a JupyterLab interface with a menu bar (File, Edit, View, Insert, Cell, Kernel, Help) and a toolbar. The top right shows 'Logout' and 'Python 3 (ipykernel)'. The main area contains several code cells:

```
In [ ]: ### Run Jupyter - MySQL
```

```
In [ ]: ## Instalando connector
```

```
In [1]: !pip install mysql-connector-python
```

Collecting mysql-connector-python
Downloading mysql_connector_python-8.0.27-1commercial-cp39-manylinux1_x86_64.whl (37.5 MB)
37.5 MB 170 kB/s
Collecting protobuf>=3.0.0
Downloading protobuf-3.18.1-cp39-cp39-manylinux2_17_x86_64.whl (1.1 MB)
1.1 MB 364 kB/s
Installing collected packages: protobuf, mysql-connector-python
Successfully installed mysql-connector-python-8.0.27 protobuf-3.18.1

```
In [ ]: ## Instalar Pandas
```

```
In [2]: !pip install pandas
```

Collecting pandas
Downloading pandas-1.3.4-cp39-cp39-manylinux2_17_x86_64.whl (11.5 MB)
11.5 MB 27 kB/s
Requirement already satisfied: pytz>=2017.3 in /opt/conda/lib/python3.9/site-packages (from pandas) (2021.3)
Requirement already satisfied: python-dateutil>=2.7.3 in /opt/conda/lib/python3.9/site-packages (from pandas) (2.8.2)
Collecting numpy>=1.17.3
Downloading numpy-1.21.2-cp39-cp39-manylinux2_12_x86_64.whl (15.8 MB)
15.8 MB 42 kB/s
Requirement already satisfied: six>=1.5 in /opt/conda/lib/python3.9/site-packages (from python-dateutil>=2.7.3->pandas) (1.16.0)
Installing collected packages: numpy, pandas
Successfully installed numpy-1.21.2 pandas-1.3.4

```
In [ ]: ## Realizar Practica
```

```
In [3]: from sqlalchemy import create_engine
import pandas as pd
```

```
In [4]: source = create_engine('mysql+mysqlconnector://test:test123@172.19.0.2/test')
```

```
In [5]: pd.read_sql('select now()', con=source)
```

```
Out[5]:
```

now()
0 2021-10-19 21:53:52

```
In [ ]:
```

```
In [ ]:
```

INTRODUCING DOCKER COMPOSE

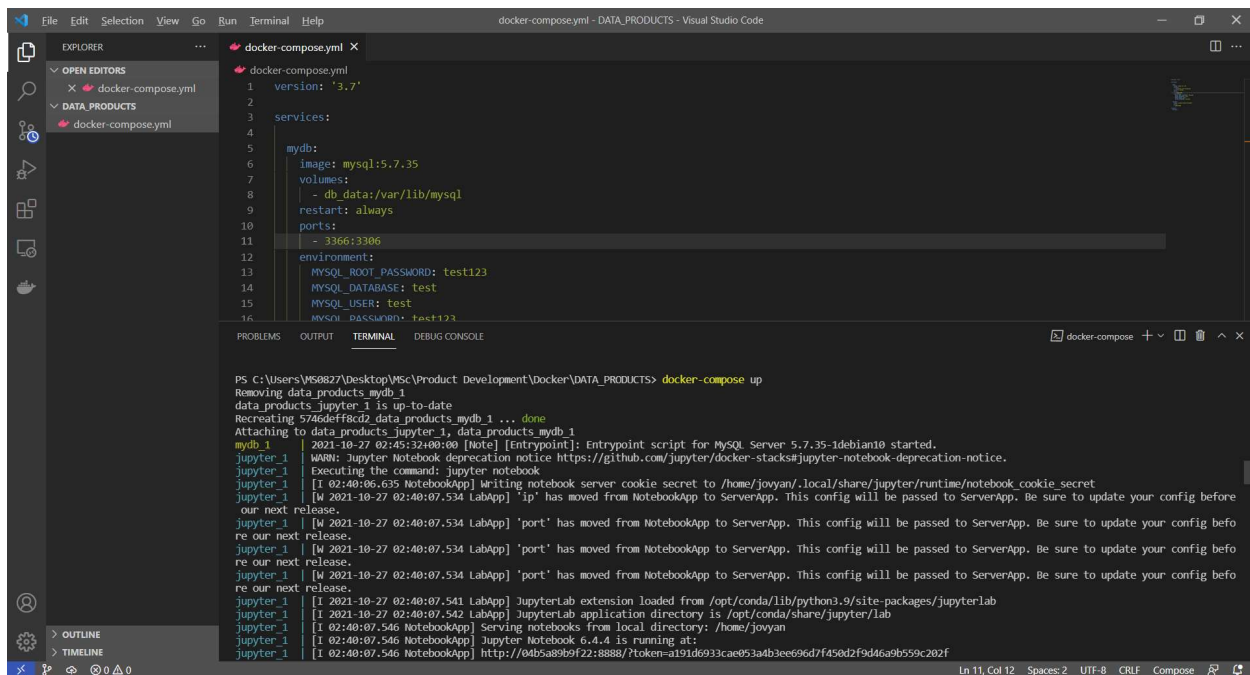
```
C:\Windows\system32>docker-compose --version
docker-compose version 1.29.2, build 5becea4c

C:\Windows\system32>docker ps
CONTAINER ID   IMAGE                                COMMAND                  CREATED        STATUS        PORTS                               NAMES
5f69aae7a1b2   jupyter/base-notebook               "tini -g -- start-no..." 45 minutes ago Up 45 minutes 0.0.0.0:8888->8888/tcp             eloquent_robinson
ffe31fac86d6   mysql:5.7.35                        "docker-entrypoint.s..." 4 hours ago    Up 4 hours    33060/tcp, 0.0.0.0:3366->3306/tcp   hungry_booth

C:\Windows\system32>docker stop eloquent_robinson
eloquent_robinson

C:\Windows\system32>docker stop hungry_booth
hungry_booth

C:\Windows\system32>
```



The screenshot shows the Visual Studio Code interface with a Docker Compose file named `docker-compose.yml` open in the editor. The file is configured for version 3.7 and defines a service named `mydb` using the `mysql:5.7.35` image. It includes a `volumes` section for `db_data`, a `restart` policy of `always`, and a `ports` mapping for `3366:3306`. The `environment` section sets `MYSQL_ROOT_PASSWORD`, `MYSQL_DATABASE`, and `MYSQL_USER` to `test`, and `MYSQL_PASSWORD` to `test123`.

The terminal output shows the command `docker-compose up` being executed. It displays the process of removing and recreating the `data_products_mydb_1` container, attaching to it, and starting the `mysql` service. The output also shows the `jupyter` service starting and serving notebooks from the local directory `/home/jovyan`.



The screenshot shows a Jupyter Notebook interface with the following content:

```

## Docker Compose

In [1]: !pip install mysql-connector-python

Collecting mysql-connector-python
  Downloading mysql-connector-python-8.0.27-1commercial-cp39-cp39-manylinux1_x86_64.whl (37.5 MB)
    [REDACTED] 37.5 MB 180 kB/s
Collecting protobuf>=3.0.0
  Downloading protobuf-3.19.0-cp39-cp39-manylinux2_17_x86_64.manylinux2014_x86_64.whl (1.1 MB)
    [REDACTED] 1.1 MB 223 kB/s
Installing collected packages: protobuf, mysql-connector-python
Successfully installed mysql-connector-python-8.0.27 protobuf-3.19.0

In [2]: !pip install pandas

Collecting pandas
  Downloading pandas-1.3.4-cp39-cp39-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (11.5 MB)
    [REDACTED] 11.5 MB 705 kB/s
Requirement already satisfied: pytz>=2017.3 in /opt/conda/lib/python3.9/site-packages (from pandas) (2021.3)
Collecting numpy>=1.17.3
  Downloading numpy-1.21.3-cp39-cp39-manylinux_2_12_x86_64.manylinux2010_x86_64.whl (15.7 MB)
    [REDACTED] 15.7 MB 4.2 MB/s
Requirement already satisfied: python-dateutil>=2.7.3 in /opt/conda/lib/python3.9/site-packages (from pandas) (2.8.2)
Requirement already satisfied: six>=1.5 in /opt/conda/lib/python3.9/site-packages (from python-dateutil>=2.7.3->pandas) (1.16.0)
Installing collected packages: numpy, pandas
Successfully installed numpy-1.21.3 pandas-1.3.4

In [4]: from sqlalchemy import create_engine
import pandas as pd

source = create_engine('mysql+mysqlconnector://test:test123@mydb/test')

In [5]: pd.read_sql('select now()', consource)

Out[5]:

```

The output of the last cell shows a timestamp: 2021-10-27 03:18:31.