

Cloud Systems

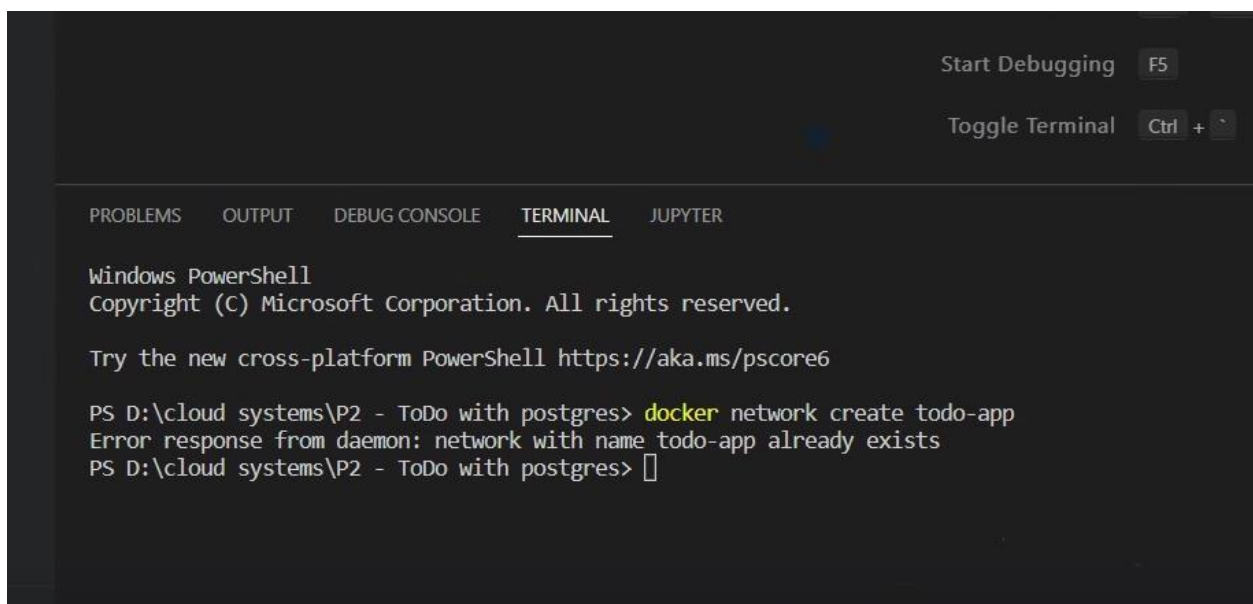
Homework 1

Multi container apps & Docker compose

GitHub link is at the end of the report.

- **1st we need to put a container in a network in order to let one container talk with another.**

We do it as in the screenshot below. (I got the error response because I had to run it again later to take a screenshot, but it ran normally on the 1st time)



```
Start Debugging F5
Toggle Terminal Ctrl + `

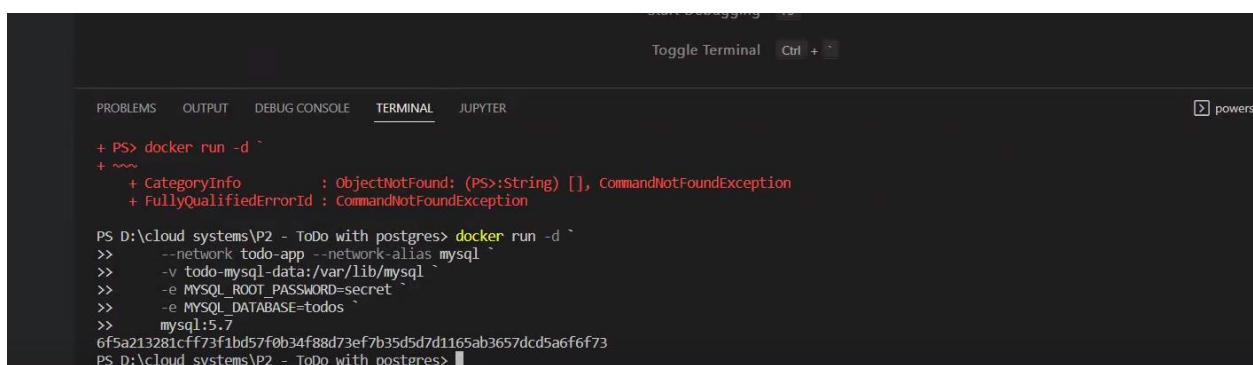
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL JUPYTER

Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/powershell

PS D:\cloud systems\P2 - ToDo with postgres> docker network create todo-app
Error response from daemon: network with name todo-app already exists
PS D:\cloud systems\P2 - ToDo with postgres> 
```

- **Now we start a MySQL container and attach it to the network:**



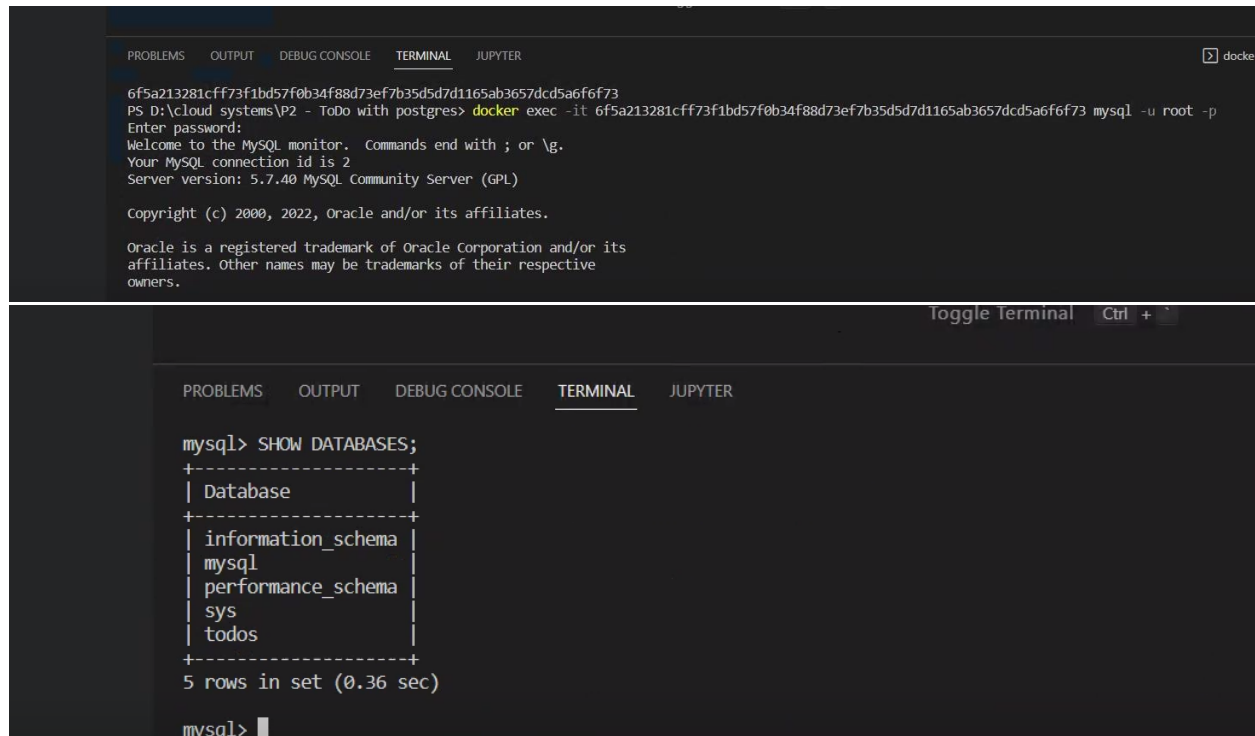
```
Toggle Terminal Ctrl + `

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL JUPYTER powershell

+ PS> docker run -d `
+ ~~~~
+ CategoryInfo          : ObjectNotFound: (PS>:String) [], CommandNotFoundException
+ FullyQualifiedErrorId : CommandNotFoundException

PS D:\cloud systems\P2 - ToDo with postgres> docker run -d `
>> --network todo-app --network-alias mysql `
>> -v todo-mysql-data:/var/lib/mysql `
>> -e MYSQL_ROOT_PASSWORD=secret `
>> -e MYSQL_DATABASE=todos `
>> mysql:5.7
6f5a213281cff73f1bd57f0b34f88d73ef7b35d5d7d1165ab3657dcd5a6f6f73
PS D:\cloud systems\P2 - ToDo with postgres> 
```

➤ Confirming we have the database up and running:



```
6f5a213281cff73f1bd57f0b34f88d73ef7b35d5d7d1165ab3657dcd5a6f6f73
PS D:\cloud systems\P2 - ToDo with postgres> docker exec -it 6f5a213281cff73f1bd57f0b34f88d73ef7b35d5d7d1165ab3657dcd5a6f6f73 mysql -u root -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 2
Server version: 5.7.40 MySQL Community Server (GPL)

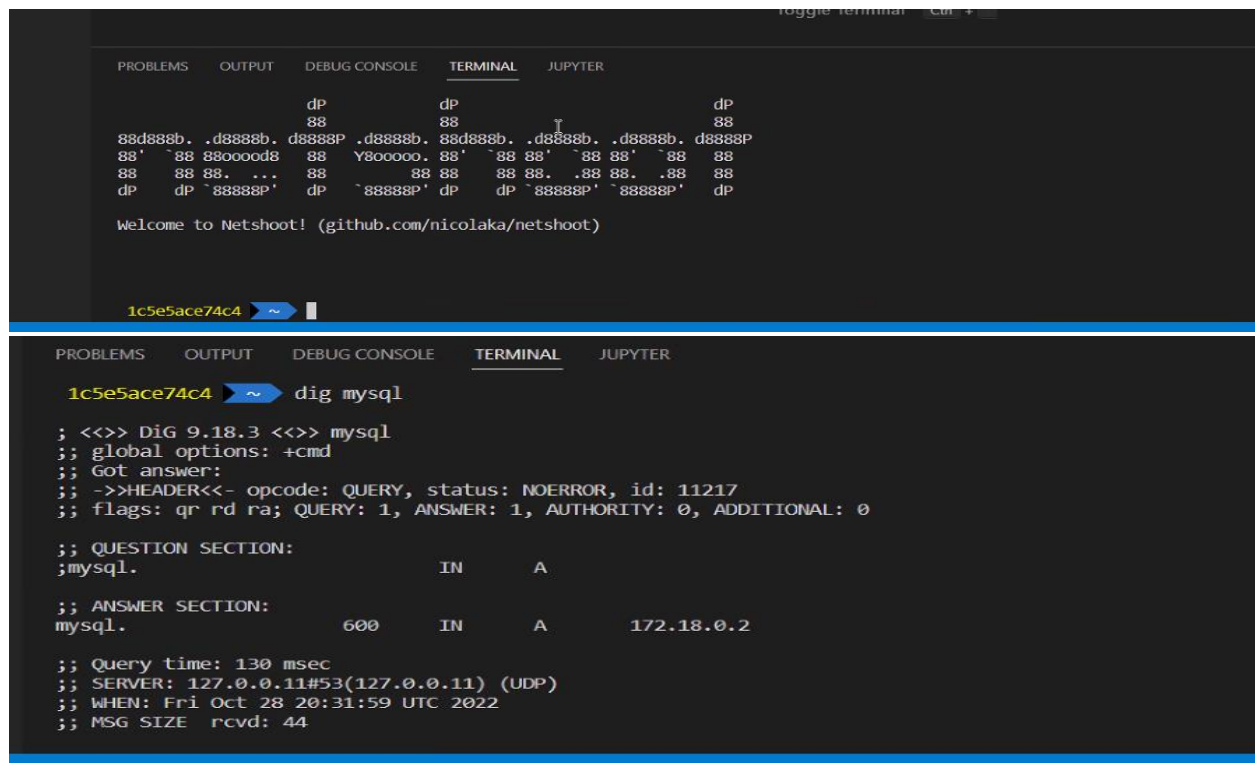
Copyright (c) 2000, 2022, Oracle and/or its affiliates.

Oracle is a registered trademark of Oracle Corporation and/or its
affiliates. Other names may be trademarks of their respective
owners.

mysql> SHOW DATABASES;
+-----+
| Database |
+-----+
| information_schema |
| mysql |
| performance_schema |
| sys |
| todos |
+-----+
5 rows in set (0.36 sec)

mysql>
```

➤ Starting a new container using the nicolaka/netshoot image.



```
1c5e5ace74c4 ~
Welcome to Netshoot! (github.com/nicolaka/netshoot)

1c5e5ace74c4 ~ dig mysql

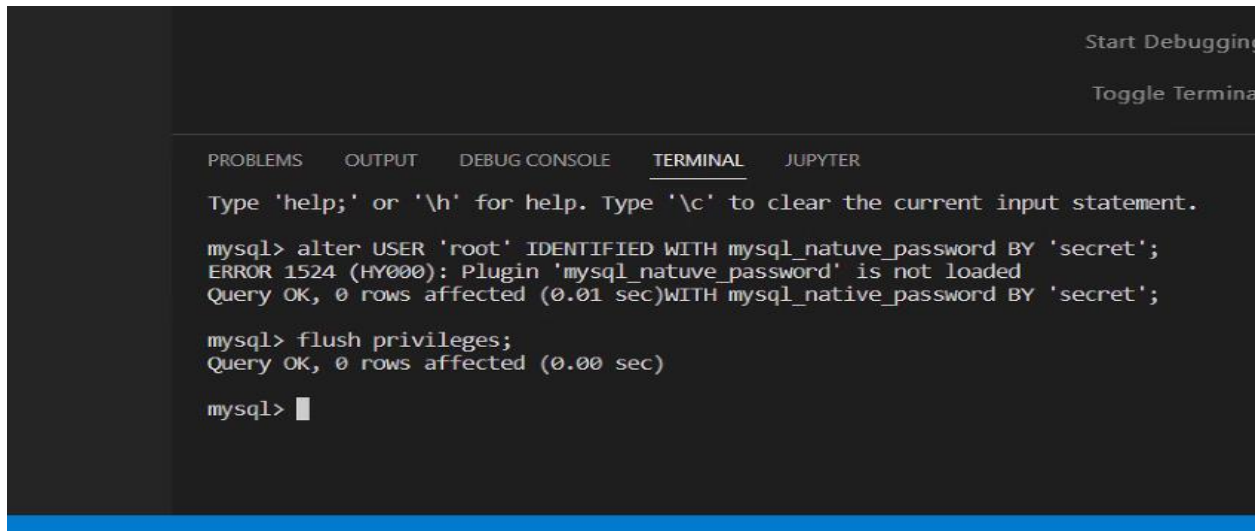
;; <<>> DiG 9.18.3 <<>> mysql
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 11217
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 0

;; QUESTION SECTION:
;mysql.                IN      A

;; ANSWER SECTION:
mysql.                600     IN      A      172.18.0.2

;; Query time: 130 msec
;; SERVER: 127.0.0.11#53(127.0.0.11) (UDP)
;; WHEN: Fri Oct 28 20:31:59 UTC 2022
;; MSG SIZE rcvd: 44
```

- **Configuring container & connecting the container to our app network:**



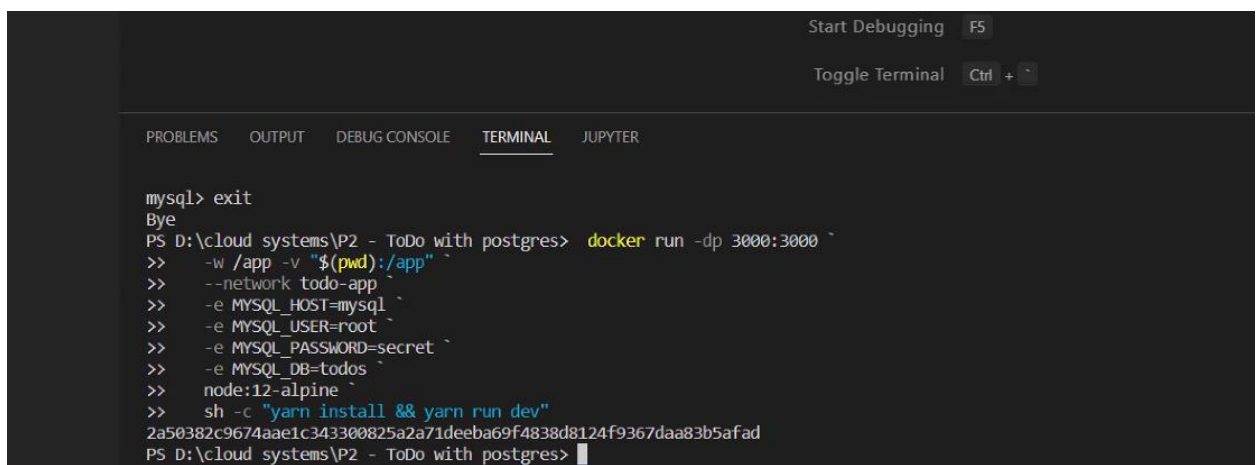
A screenshot of a VS Code terminal window. The terminal has tabs for PROBLEMS, OUTPUT, DEBUG CONSOLE, TERMINAL, and JUPYTER. The terminal output shows the following commands and responses:

```
Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> alter USER 'root' IDENTIFIED WITH mysql_native_password BY 'secret';
ERROR 1524 (HY000): Plugin 'mysql_native_password' is not loaded
Query OK, 0 rows affected (0.01 sec)WITH mysql_native_password BY 'secret';

mysql> flush privileges;
Query OK, 0 rows affected (0.00 sec)

mysql> 
```



A screenshot of a VS Code terminal window. The terminal has tabs for PROBLEMS, OUTPUT, DEBUG CONSOLE, TERMINAL, and JUPYTER. The terminal output shows the following commands and responses:

```
mysql> exit
Bye
PS D:\cloud systems\P2 - ToDo with postgres> docker run -dp 3000:3000 `
>> -w /app -v "$(pwd):/app" `
>> --network todo-app `
>> -e MYSQL_HOST=mysql `
>> -e MYSQL_USER=root `
>> -e MYSQL_PASSWORD=secret `
>> -e MYSQL_DB=todos `
>> node:12-alpine `
>> sh -c "yarn install && yarn run dev"
2a50382c9674aae1c343300825a2a71deeba69f4838d8124f9367daa83b5afad
PS D:\cloud systems\P2 - ToDo with postgres> 
```

- **Added an item through the app in the browser and then checking it in MySQL:**

```
Toggle Terminal  Ctrl + `

PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  JUPYTER

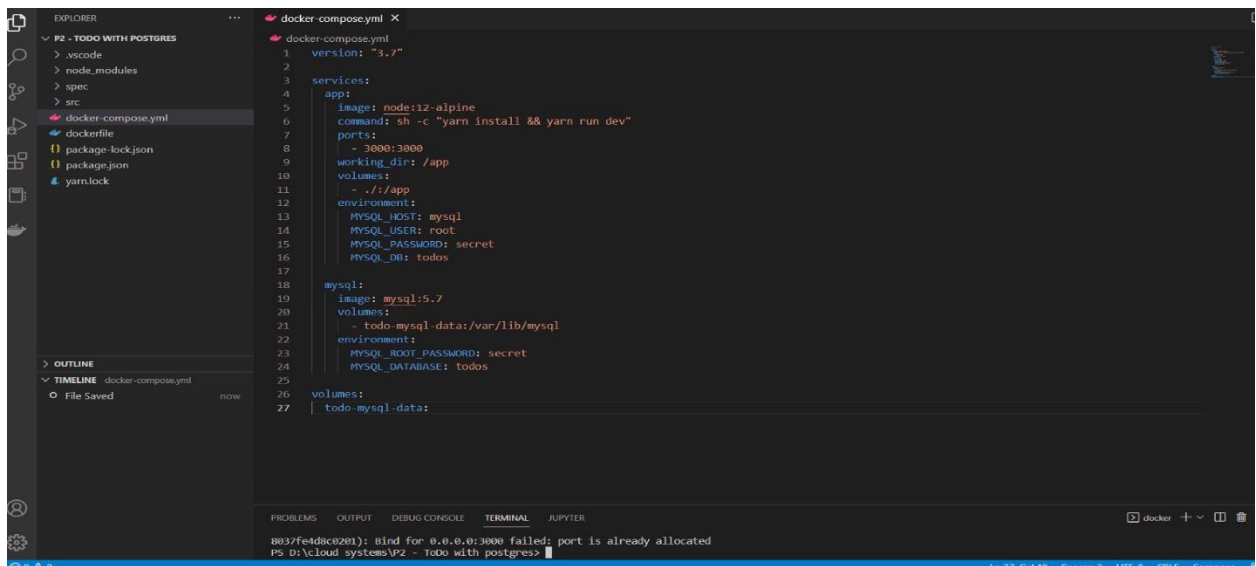
affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> select * from todo_items;
+-----+-----+-----+
| id                | name      | completed |
+-----+-----+-----+
| 8945hfwk-8a5f-3e3t-tj95-1g65g7589942 | tarek item | 0         |
+-----+-----+-----+
1 row in set (0.00 sec)

mysql> 
```

- Creating the docker compose file and filling it: (in the screenshot, you will see the final version of the file)



The screenshot shows the VS Code interface with the Explorer sidebar on the left and the docker-compose.yml file open in the editor. The Explorer sidebar shows the file structure of the project, including the docker-compose.yml file. The docker-compose.yml file is defined as follows:

```
1 version: "3.7"
2
3 services:
4   app:
5     image: node:12-alpine
6     command: sh -c "yarn install && yarn run dev"
7     ports:
8       - 3000:3000
9     working_dir: /app
10    volumes:
11      - ./app
12    environment:
13      MYSQL_HOST: mysql
14      MYSQL_USER: root
15      MYSQL_PASSWORD: secret
16      MYSQL_DB: todos
17
18   mysql:
19     image: mysql:5.7
20     volumes:
21       - todo-mysql-data:/var/lib/mysql
22     environment:
23       MYSQL_ROOT_PASSWORD: secret
24       MYSQL_DATABASE: todos
25
26 volumes:
27   todo-mysql-data:
```

- Defining app service:

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  JUPYTER

>> --network todo-app --network-alias mysql
>> -v todo-mysql-data:/var/lib/mysql
>> -e MYSQL_ROOT_PASSWORD=secret
>> -e MYSQL_DATABASE=todos
>> mysql:5.7
126a2bb62ae5b31f374b793b5114ff9dcff941b3363b58cc9d52861e95b8e654
PS D:\cloud systems\VP2 - ToDo with postgres> docker compose up -d
[+] Running 2/3
 - Network p2-todowithpostgres_default Created 1.5s
 - Container p2-todowithpostgres-app-1 Starting 8.9s
 - Container p2-todowithpostgres-mysql-1 Started 8.9s
Error response from daemon: driver failed programming external connectivity on endpoint p2-todowithpostgres-app-1 (8ec4dab4c8912be4944da2ce6dd6ac07cda93dda45e7371da9
8037fe4d8c0201): Bind for 0.0.0.0:3000 failed: port is already allocated
PS D:\cloud systems\VP2 - ToDo with postgres> 
```

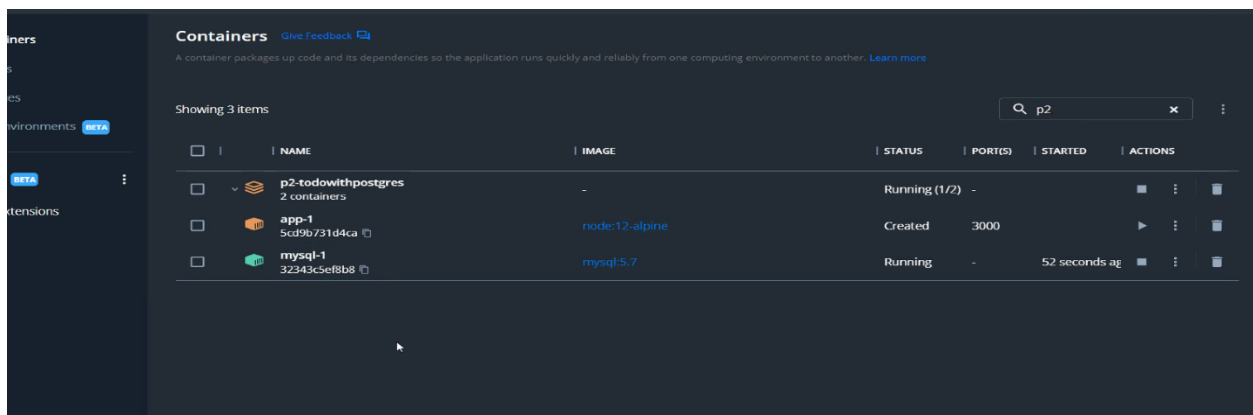
➤ Defining the MySQL service:

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL JUPYTER
>> -e MYSQL_DB=todos `
>> node:12-alpine `
>> sh -c "yarn install && yarn run dev"
b5202dbc435b89d946c637f51acf2405c80cf883ea9d44f82d899cc0210f8b92
docker: Error response from daemon: driver failed programming external connectivity on endpoint pensive_moore (9d2a95b98ac93a10831e8e69650e85fd51418be42d27df30b9edba
dc28b6fab2): Bind for 0.0.0.0:3000 failed: port is already allocated.
PS D:\cloud systems\P2 - Todo with postgres> docker run -d `
>> --network todo-app --network-alias mysql `
>> -v todo-mysql-data:/var/lib/mysql `
>> -e MYSQL_ROOT_PASSWORD=secret `
>> -e MYSQL_DATABASE=todos `
>> mysql:5.7
126a2bb62ae5b31f374b793b5114ff9dcff941b3363b58cc9d52861e95b8e654
PS D:\cloud systems\P2 - Todo with postgres>
```

➤ Starting the application stack:

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL JUPYTER
>> --network todo-app --network-alias mysql `
>> -v todo-mysql-data:/var/lib/mysql `
>> -e MYSQL_ROOT_PASSWORD=secret `
>> -e MYSQL_DATABASE=todos `
>> mysql:5.7
126a2bb62ae5b31f374b793b5114ff9dcff941b3363b58cc9d52861e95b8e654
PS D:\cloud systems\P2 - Todo with postgres> docker compose up -d
[+] Running 2/3
- Network p2-todowithpostgres_default Created 1.5s
- Container p2-todowithpostgres-app-1 Starting 8.9s
- Container p2-todowithpostgres-mysql-1 Started 8.9s
Error response from daemon: driver failed programming external connectivity on endpoint p2-todowithpostgres-app-1 (8ec4dab4c8912be4944da2ce6dd6ac07cda93dda45e7371da9
8037fe4d8c8201): Bind for 0.0.0.0:3000 failed: port is already allocated
PS D:\cloud systems\P2 - Todo with postgres>
```

➤ App stack appear in Docker Dashboard:



So, in this homework, I learned how to setup multi container apps and how to use docker compose to define the app stack in 1 file.

➤ GitHub Link: <https://github.com/TrX9/CloudSystemsHW1>