

hw1

1. postgres

1. install

```
# Use postgres/example user/password credentials
version: '3.1'

services:

  db:
    image: postgres
    restart: always
    environment:
      POSTGRES_PASSWORD: example
```

```
~/code/university/database
> docker-compose up
WARN[0000] Found orphan containers ([database-adminer-1]) for this project. If you removed or renamed this service in your compose file, you can run this command with the --remove-orphans flag to clean it up.
[+] Running 1/0
 ✓ Container database-db-1 Created 0.0s
Attaching to database-db-1
database-db-1 |
database-db-1 | PostgreSQL Database directory appears to contain a database; Skipping initialization
database-db-1 |
database-db-1 | 2023-09-30 17:59:05.218 UTC [1] LOG:  starting PostgreSQL 16.0 (Debian 16.0-1.pgdg120+1)
database-db-1 | on x86_64-pc-linux-gnu, compiled by gcc (Debian 12.2.0-14) 12.2.0, 64-bit
database-db-1 | 2023-09-30 17:59:05.219 UTC [1] LOG:  listening on IPv4 address "0.0.0.0", port 5432
database-db-1 | 2023-09-30 17:59:05.219 UTC [1] LOG:  listening on IPv6 address ":::", port 5432
database-db-1 | 2023-09-30 17:59:05.223 UTC [1] LOG:  listening on Unix socket "/var/run/postgresql/.s.PGSQL.5432"
database-db-1 | 2023-09-30 17:59:05.229 UTC [30] LOG:  database system was shut down at 2023-09-30 17:59:03 UTC
database-db-1 | 2023-09-30 17:59:05.235 UTC [1] LOG:  database system is ready to accept connections
```

2. CREATE USER

```
postgres=# create user dio
postgres=# ;
CREATE ROLE
```

3. CREATE DATABASE

```
postgres=# create database testdatabase;
CREATE DATABASE
```

4. CREATE TABLE

```
postgres=# create table test_table(day int);
CREATE TABLE
```

5. SHOW DATABASES

```
postgres=# \l
```

Name	Owner	Encoding	Locale Provider	Collate	Ctype	ICU Locale	ICU Rules	Access privileges
dd	postgres	UTF8	libc	en_US.utf8	en_US.utf8			
postgres	postgres	UTF8	libc	en_US.utf8	en_US.utf8			
template0	postgres	UTF8	libc	en_US.utf8	en_US.utf8			=c/postgres +
template1	postgres	UTF8	libc	en_US.utf8	en_US.utf8			postgres=CTc/postgres +
test	postgres	UTF8	libc	en_US.utf8	en_US.utf8			=c/postgres +
testdatabase	postgres	UTF8	libc	en_US.utf8	en_US.utf8			postgres=CTc/postgres

(6 rows)

6. SHOW TABLES

```
postgres=# \dt
```

Schema	Name	Type	Owner
public	dd	table	postgres
public	test	table	postgres
public	test_table	table	postgres
public	testdatabase	table	postgres

(4 rows)

7. SHOW COLUMNS

```
postgres=# \d test_table
```

Column	Type	Collation	Nullable	Default
day	integer			

8. DESCRIBE

```
postgres=# \d test_table;
```

Column	Type	Collation	Nullable	Default
day	integer			

2. main characteristics of database approach

1. DBMS儲存特定資料庫的描述，稱為meta-data
2. meta-data允許DBMS在不同資料庫軟體裏都能動
3. 允許使用者並行檢索和更新資料庫。
4. 允許資料與程式保持獨立，讓使用者可以更改資料已結構而不用更改DBMS
5. DBMS確保每個transaction 正確執行或中止
6. 復原系統把每個已完成的Transaction的作用記錄在資料庫中
7. OPTP允需每秒執行很多併發transactions
8. 支援多種資料視圖
9. 資料抽象，讓使用者不需要接觸實際資料儲存細節
10. 資料庫可以根據使用者權限控制對資料的存取

3. define terms

1. data model:

描述資料庫結構、操作這些結構的操作以及資料庫應遵守的某些約束的一組概念，提供實現資料抽象的手段。提供與許多使用者使用資料的方式接近的概念。

2. database schema:

資料庫的敘述，包含資料結構種類與限制

4.

1. three schema architecture:

1. Internal schema

- 描述物理儲存架構和存取路徑

2. Conceptual schema

- 敘述使用者定義的資料架構與資料限制

3. External schemas

- 通常為data model
- 敘述部分使用者有興趣的資料，隱藏其他資料

2.

- logical data independence: change the conceptual schema without having to change the external schemas
- physical data independence: change the internal schema without having to change the conceptual schema.

5.

	Entity 1	Cardinality Ratio	Entity 2
1.	Student	one-to-many	Book
2.	Student	many-to-one	Advisor
3.	ClassRoom	many-to-many	Wall
4.	Student	many-to-many	Course
5.	Car	one-to-one	Engine

1. a student have many book, a book have one owner.
2. a student have one advisor, a advisor have many student.
3. a classroom have many wall, a wall can be two classroom wall.
4. a student have many course, a course have many student.
5. a car have one engine, a engine have only car.

6.

a.

student(Student ID No. , name, address, ID No. ,cellphone, class, Department/Graduate Institute, suspension)

Suspension(No. , student ID No. , Term of suspension, signature, signed by parent, date of application, date of resumption, application)

b.

