

Mysql in Docker

1.First run docker

```
C:\Users\Lenovo>docker
Usage:  docker [OPTIONS] COMMAND

A self-sufficient runtime for containers

Common Commands:
  run          Create and run a new container from an image
  exec        Execute a command in a running container
  ps          List containers
  build       Build an image from a Dockerfile
  bake        Build from a file
  pull        Download an image from a registry
  push        Upload an image to a registry
  images      List images
  login        Authenticate to a registry
  logout      Log out from a registry
```

2.After docker pull mysql in it

```
C:\Users\Lenovo>docker pull mysql:8.0
8.0: Pulling from library/mysql
Digest: sha256:0546f878adee48eef82ccf936fc8ff932bdaa180ee614a8043ca917533654bc1
Status: Image is up to date for mysql:8.0
docker.io/library/mysql:8.0
```

3.Run mysql container (one command)

```
C:\Users\Lenovo>docker run --name mysql-normalization -e MYSQL_ROOT_PASSWORD=root -e MYSQL_DATABASE=university -p 3306:3306 -d mysql:8.0
18dd53990183ca46fafa3dcdeb548ffaa52fdfe08e2a3f3be3c35c9cdc29b597b
docker: Error response from daemon: failed to set up container networking: driver failed programming external connectivity on endpoint mysql-normalization (a007beff64abfda074aac2dd76e976ec8808cdc00401620a7b874160e44aa4bf): Bind for 0.0.0.0:3306 failed: port is already allocated

Run 'docker run --help' for more information
```

4. Check container is running or not by using command docker ps

```
C:\Users\Lenovo>docker ps
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS
2c6a8c66a0d9   mysql:8.0     "docker-entrypoint.s..." 5 hours ago   Up 5 hours   0.0.0.0:3306->3306/tcp,
```

5. Now the next step is to enter mysql inside docker (run below command and enter password root)

```
C:\Users\Lenovo>docker exec -it 2c6 mysql -u root -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 15
Server version: 8.0.45 MySQL Community Server - GPL

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owners.

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

6. After that select the database

```
mysql> USE university;
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
```

7. Create the original table

```
Database changed
mysql> CREATE TABLE UniversityRegistration (
  ->   StudentID VARCHAR(10),
  ->   Name VARCHAR(100),
  ->   Email VARCHAR(100),
  ->   Major VARCHAR(50),
  ->   Advisor VARCHAR(100),
  ->   CourseID VARCHAR(10),
  ->   CourseTitle VARCHAR(100),
  ->   Credits INT,
  ->   Building VARCHAR(50),
  ->   Room VARCHAR(10),
  ->   Grade CHAR(1)
  -> );
```

8. Insert same data (but here I used 4 list instead of 5)

```
ERROR 1050 (42S01): Table 'UniversityRegistration' already exists
mysql> INSERT INTO UniversityRegistration VALUES
-> ('S101', 'Alice', 'alice@uni.edu', 'CS', 'Dr. Smith', 'CS301', 'Algorithms', 4, 'Science', '205', 'A'),
-> ('S101', 'Alice', 'alice@uni.edu', 'CS', 'Dr. Smith', 'MATH201', 'Linear Algebra', 3, 'Math Wing', '101', 'B'),
-> ('S102', 'Bob', 'bob@uni.edu', 'CS', 'Dr. Smith', 'CS301', 'Algorithms', 4, 'Science', '205', 'C'),
-> ('S103', 'Carol', 'carol@uni.edu', 'Physics', 'Dr. Lee', 'PHYS101', 'Mechanics', 4, 'Science', '301', 'A');
Query OK, 4 rows affected (0.09 sec)
Records: 4  Duplicates: 0  Warnings: 0
```

9. View original table (Proof)

```
mysql> SELECT * FROM UniversityRegistration;
```

StudentID	Name	Email	Major	Advisor	CourseID	CourseTitle	Credits	Building	Room	Grade
S101	Alice	alice@uni.edu	CS	Dr. Smith	CS301	Algorithms	4	Science	205	A
S101	Alice	alice@uni.edu	CS	Dr. Smith	MATH201	Linear Algebra	3	Math Wing	101	B
S102	Bob	bob@uni.edu	CS	Dr. Smith	CS301	Algorithms	4	Science	205	C
S103	Carol	carol@uni.edu	Physics	Dr. Lee	PHYS101	Mechanics	4	Science	301	A

```
4 rows in set (0.00 sec)
```

10. Create major table

```
mysql> CREATE TABLE Majors (
->   Major VARCHAR(50) PRIMARY KEY,
->   Advisor VARCHAR(100) NOT NULL
-> );
```

11. Create students table

```
mysql> CREATE TABLE Students (
->   StudentID VARCHAR(10) PRIMARY KEY,
->   Name VARCHAR(100) NOT NULL,
->   Email VARCHAR(100) UNIQUE NOT NULL,
->   Major VARCHAR(50),
->   FOREIGN KEY (Major) REFERENCES Majors(Major)
-> );
```

12. Create courses table

```
mysql> CREATE TABLE Courses (
->   CourseID VARCHAR(10) PRIMARY KEY,
->   CourseTitle VARCHAR(100) NOT NULL,
->   Credits INT NOT NULL,
->   Building VARCHAR(50),
->   Room VARCHAR(10)
-> );
```

13. Create enrollments

```
mysql> CREATE TABLE Enrollments (  
  ->   StudentID VARCHAR(10),  
  ->   CourseID VARCHAR(10),  
  ->   Grade CHAR(1),  
  ->   PRIMARY KEY (StudentID, CourseID),  
  ->   FOREIGN KEY (StudentID) REFERENCES Students(StudentID),  
  ->   FOREIGN KEY (CourseID) REFERENCES Courses(CourseID)  
  -> );
```

14. Insert into majors

```
mysql> INSERT INTO Majors VALUES  
  -> ('CS', 'Dr. Smith'),  
  -> ('Physics', 'Dr. Lee');  
ERROR 1062 (23000): Duplicate entry 'CS' for key 'Majors.PRIMARY'  
mysql>
```

15. Insert into students

```
mysql> INSERT INTO Students VALUES  
  -> ('S101', 'Alice', 'alice@uni.edu', 'CS'),  
  -> ('S102', 'Bob', 'bob@uni.edu', 'CS'),  
  -> ('S103', 'Carol', 'carol@uni.edu', 'Physics');  
ERROR 1062 (23000): Duplicate entry 'S101' for key 'Students.PRIMARY'
```

16. Inserts into courses

```
mysql> INSERT INTO Courses VALUES  
  -> ('CS301', 'Algorithms', 4, 'Science', '205'),  
  -> ('MATH201', 'Linear Algebra', 3, 'Math Wing', '101'),  
  -> ('PHYS101', 'Mechanics', 4, 'Science', '301');  
ERROR 1062 (23000): Duplicate entry 'CS301' for key 'Courses.PRIMARY'
```

17. Insert into enrollments

```
mysql> INSERT INTO Enrollments VALUES  
  -> ('S101', 'CS301', 'A'),  
  -> ('S101', 'MATH201', 'B'),  
  -> ('S102', 'CS301', 'C'),  
  -> ('S103', 'PHYS101', 'A');  
ERROR 1062 (23000): Duplicate entry 'S101-CS301' for key 'Enrollments.PRIMARY'
```

18. Reconstruct original table using join

```
mysql> SELECT
->   s.StudentID,
->   s.Name,
->   s.Email,
->   s.Major,
->   m.Advisor,
->   c.CourseID,
->   c.CourseTitle,
->   c.Credits,
->   e.Grade,
->   c.Building,
->   c.Room
-> FROM Students s
-> JOIN Majors m ON s.Major = m.Major
-> JOIN Enrollments e ON s.StudentID = e.StudentID
-> JOIN Courses c ON e.CourseID = c.CourseID;
```

StudentID	Name	Email	Major	Advisor	CourseID	CourseTitle	Credits	Grade	Building	Room
S101	Alice	alice@uni.edu	CS	Dr. Smith	CS301	Algorithms	4	A	Science	205
S101	Alice	alice@uni.edu	CS	Dr. Smith	MATH201	Linear Algebra	3	B	Math Wing	101
S102	Bob	bob@uni.edu	CS	Dr. Smith	CS301	Algorithms	4	C	Science	205
S103	Carol	carol@uni.edu	Physics	Dr. Lee	PHYS101	Mechanics	4	A	Science	301

4 rows in set (0.01 sec)