

## 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: sha256:0546f878addee48eef82ccf936fc8ff932bdaa180ee614a8043ca917533654bc1
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
18dd53990183ca46faf3dcdeb548ffaa52fdfe08e2a3fbe3c35c9cdc29b597b
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,
l
```

**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