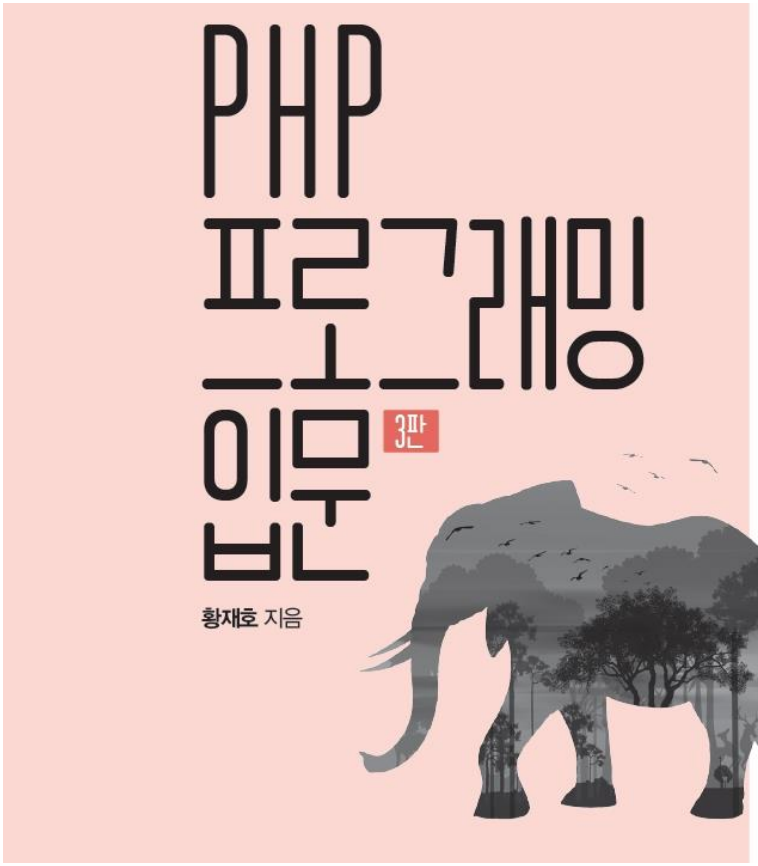

Chapter 09 MySQL 데이터베이스

01 DataBase

1. Database Management System

A database management system (DBMS) communicates and processes applications requested by an application while communicating with the database.

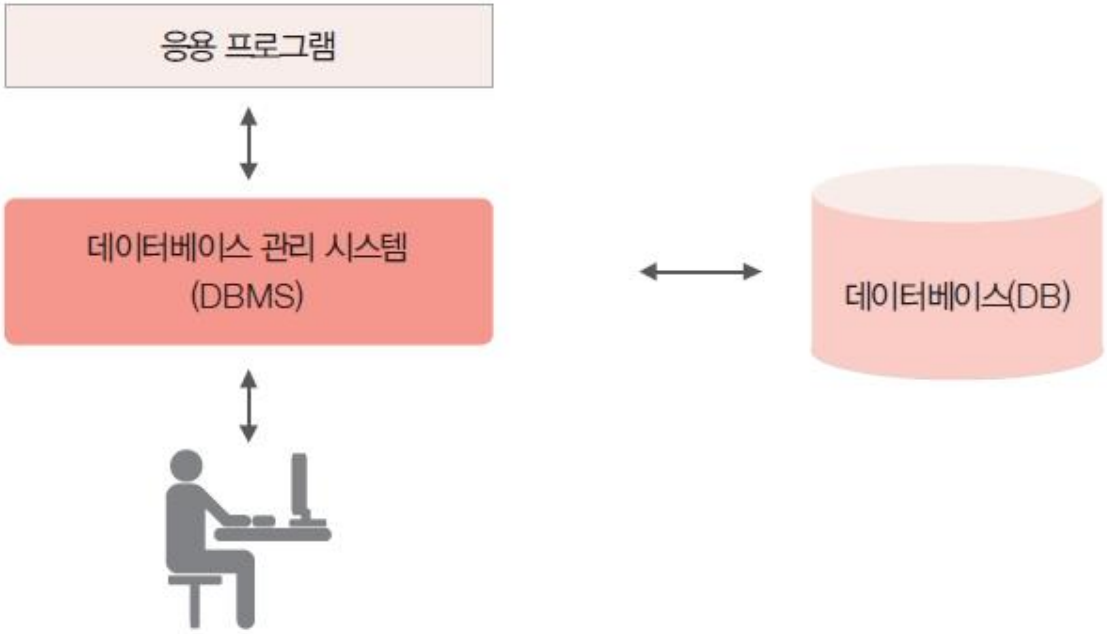

그림 9-1 DBMS의 개념

01 DataBase

- MySQL belongs to the Relational DataBase Management System (RDBMS) among DBMSs.
- An RDBMS is the storage of data in the form of tables and the definition of relationships between these data.
- All data in an RDBMS is stored in a two-dimensional table and can be retrieved, modified, and deleted.
- The three basic components of an RDBMS are table, field, and record.

일련번호	이름	학번	수강 과목	성적
1	황예린	201903114001	PHP	98
2	김수겸	201903114002	파이썬	76
3	이수진	201903114003	컴퓨터 구조	87
4	나여진	201903114004	알고리즘 기초	94

그림 9-2 RDBMS의 기본 구성 요소

- A table is the basic unit that stores and manages data in a database and consists of fields and records. Fields represent columns in a table, and records represent rows.

2. MySQL

- MySQL based on SQL is an RDBMS that is widely used in various fields.
- The advantages of MySQL can be summarized as follows:
  - The most used database. Free to use, but requires license purchase to use for commercial purposes.
  - The processing speed of DBMS is quite fast.
  - Easy to install and use, making it easily accessible to beginners.
  - Easily handle large amounts of data.
  - Highly secure.

02 MySQL Server and phpMyAdmin

1. MySQL Server Startup

① Before running the MySQL server, you need to set the character set so that Hangul is displayed properly.

② To set the charset to UTF-8 in MySQL, you must change the my.ini file in the C:₩xampp₩mysql₩bin folder.

③ Load the my.ini file in that folder from the notepad as follows:

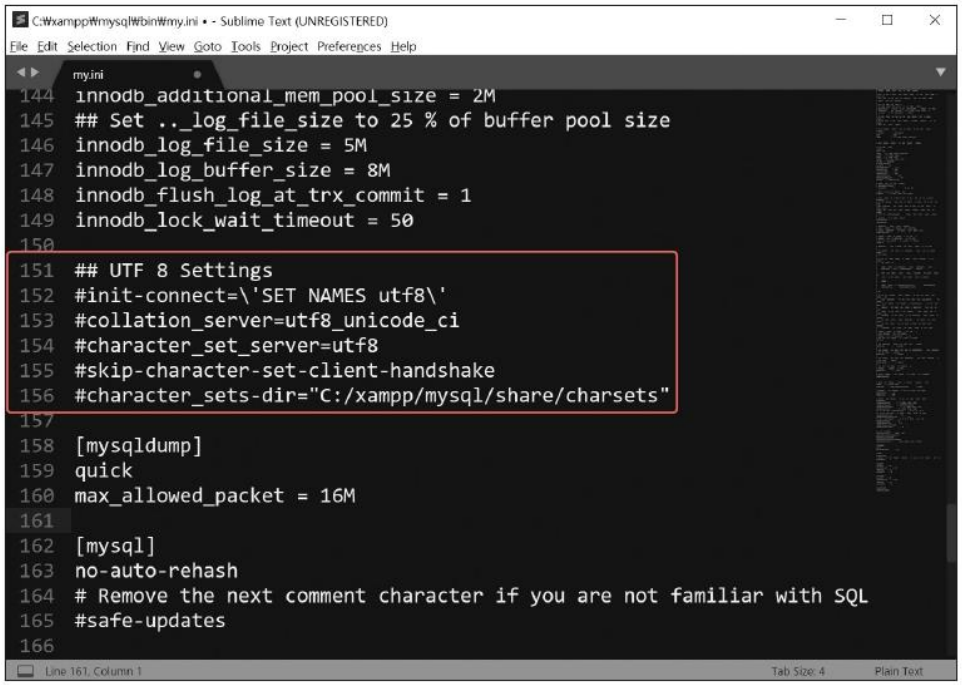

그림 9-3 C:₩xampp₩mysql₩bin 폴더의 my.ini 파일

02 MySQL Server and phpMyAdmin

- Modify the five lines under '## UTF 8 Settings' and press [Ctrl]+[S] to save the my.ini file.

```
...
## UTF 8 Settings
init-connect= SET NAMES utf8
collation_server=utf8_general_ci
character_set_server=utf8
skip-character-set-client-handshake
character_sets-dir="C:/xampp/mysql/share/charsets"
...
```

02 MySQL Server and phpMyAdmin

- Once you have modified and saved the my.ini file, open the XAMPP control panel and click the Start menu in MySQL.

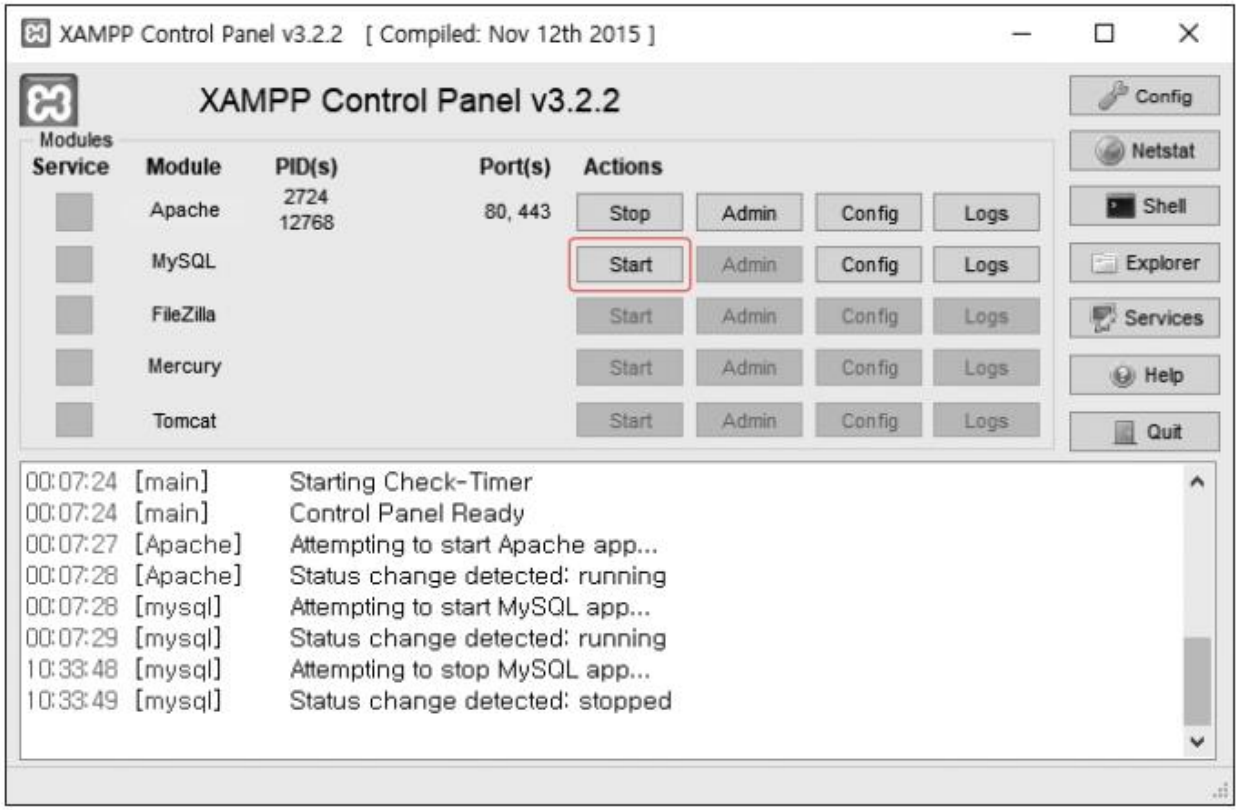

그림 9-4 MySQL 서버 프로그램 시작 전의 XAMPP 컨트롤 패널

02 MySQL Server and phpMyAdmin

- If the module of the MySQL server is displayed in green, the MySQL server program is running properly.

-

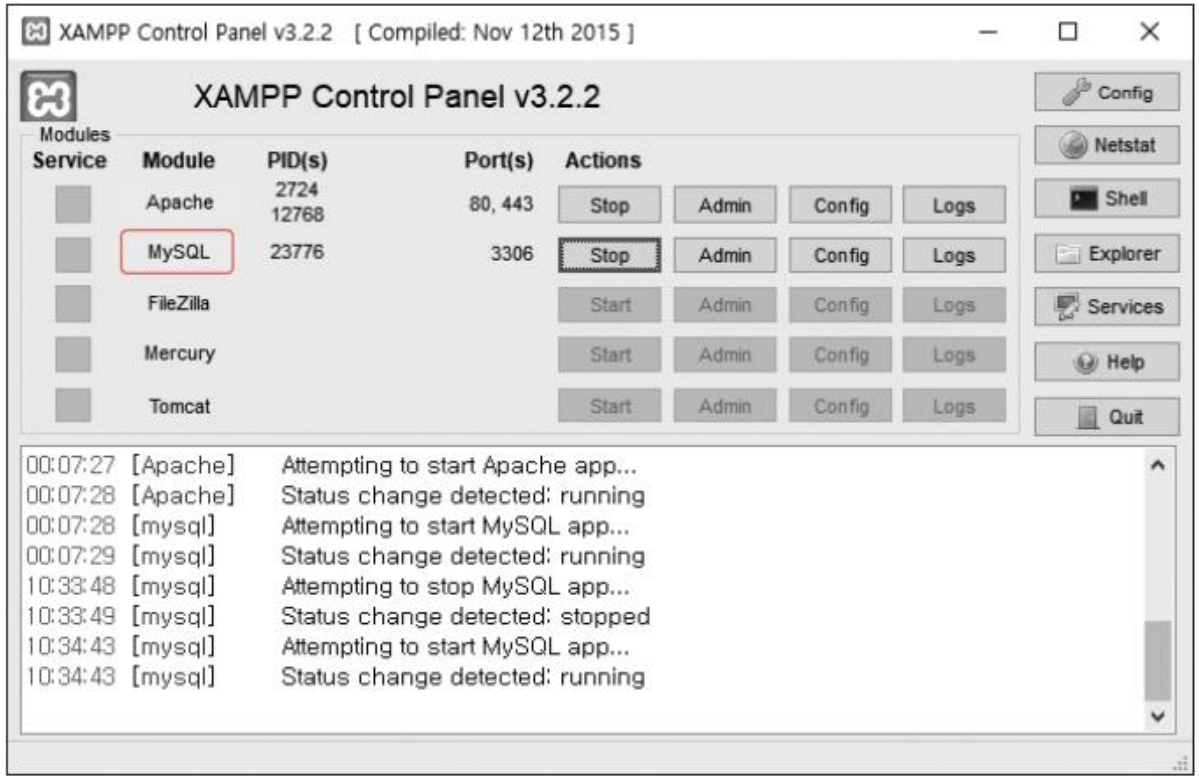

그림 9-5 MySQL 서버 프로그램이 구동 중인 XAMPP 컨트롤 패널

02 MySQL Server and phpMyAdmin

2. Start phpMyAdmin

- After running the MySQL server program, you need a MySQL program to use on the client side. In Chapter 1, use the phpMyAdmin program installed with XAMPP.
- Enter http://localhost in the web browser address bar to access XAMPP, click the [phpMyAdmin] menu in the upper right corner of the screen.
-

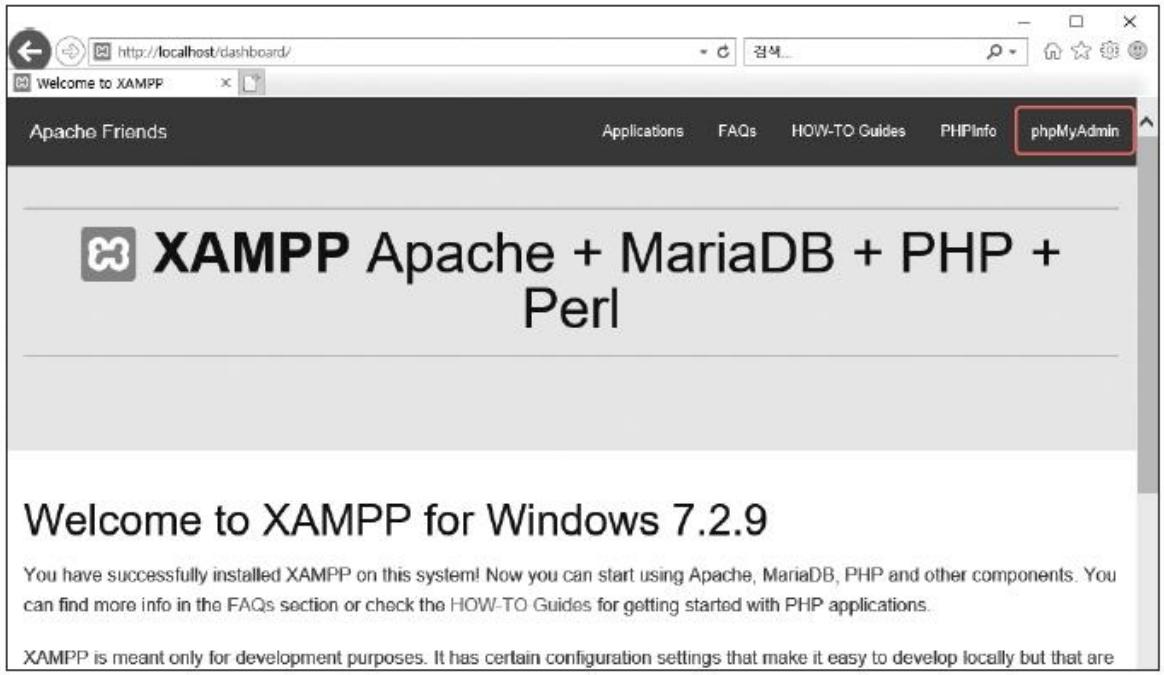

그림 9-6 XAMPP 메인 화면

02 MySQL Server and phpMyAdmin

- The phpMyAdmin page appears. Perform the MySQL lab on this screen.

그림 9-7 phpMyAdmin 메인 화면

03 Creating Database

- Click the [Database] menu at the top of the main screen to create a new database using phpMyAdmin.
- Under 'Create a new database', set the database name and collation method as follows, and <만들기>then click Next.
  - Database Name: sample
  - Collation method: utf8_general_ci

03 Creating Database

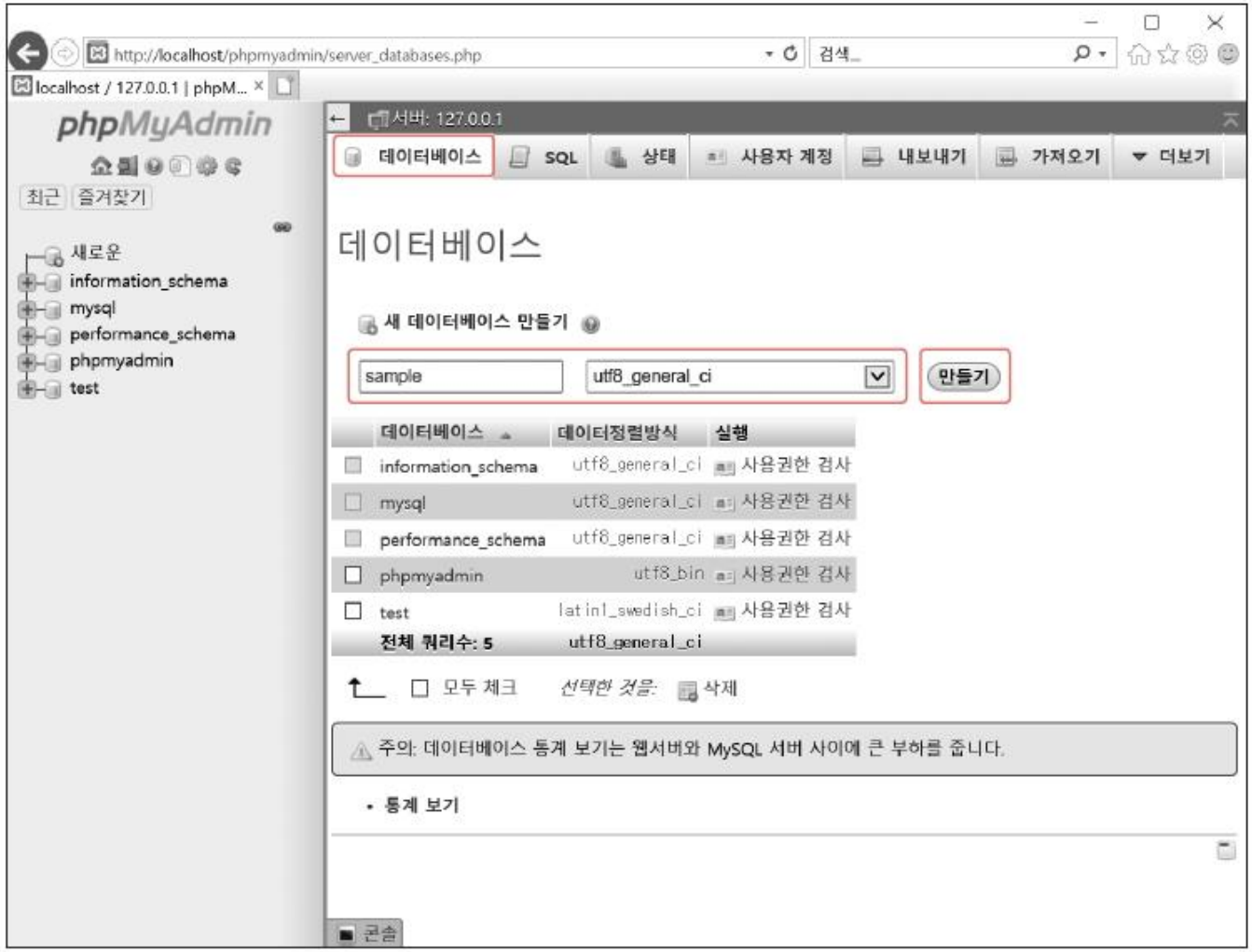

그림 9-8 새로운 데이터베이스 생성

03 Creating Database

- Click the phpMyAdmin logo in the upper left corner of the screen and click the [Database] menu on the main screen to see that a sample database has been created.

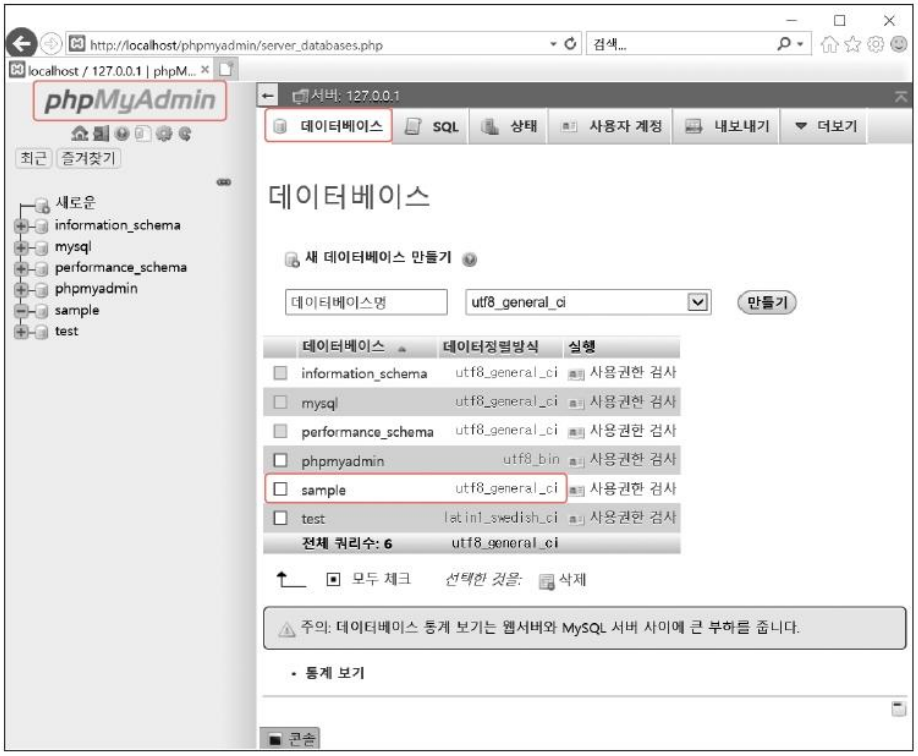

그림 9-9 sample 데이터베이스 생성

04 Managing Database Tables

1. Designing Database Tables

① Design a 'Member Information Table' to manage member information. The table name is mem.

필드명	데이터형	null	추가 사항	설명
num	int	not null	auto_increment, primary key	일련번호
id	char(20)	not null		아이디
pass	char(20)	not null		비밀번호
name	char(20)	not null		이름
age	int			나이

- In the member information table, set the field names for storing members' serial number, ID, password, name, and age to num, id, pass, name, and age, respectively.
- The num field refers to the data of one member, that is, the unique number attached to the record..

04 Managing Database Tables

▪ Data type

- An int, meaning an integer number, indicates that the data stored in the field is an integer.
- The char type means a data type for storing characters, and char(20) refers to an alphabetic or numeric refers to a space that can store up to 20 characters (10 characters in Korean).

▪ null

- null means a data type with no data value, written as '' or ' '.
- Setting a field to not null means it should not be null.
- Fields set to NOT NULL must be filled in when entering data in the record, for example, a mandatory item for signing up on a website is set to NOT NULL.
- In the Member Information table, the num, id, pass, and name fields are required and set to not null.

04 Managing Database Tables

- Extras
- auto_increment means that when you enter data into a record, the field value is automatically incremented. The num field is set to auto_increment, which means that when you enter data into a record, the value automatically increments from 0 to 1 and is stored in the num field, even if you do not enter a value in the num field.
- Primary key refers to a field in a table that must not be duplicated, that is, a field that is used to identify a record. When filling out the membership form on the website, you usually use an ID or serial number to identify the record, but here you set the num field as the primary key. For reference, if there is a field with auto_increment applied when designing a DB table, you must use that field as the main key.

04 Managing Database Tables

2. 데이터베이스 테이블 생성

```
create table 테이블명 (
    필드명1 데이터형,
    필드명2 데이터형,
    필드명3 데이터형,
    ...
    primary key(필드명)
);
```

- The create table command uses field name 1, field name 2, ... Create a DB table with a structure of 'Table Name'. Primary key means that the 'field name' is the primary key.

04 Managing Database Tables

- On the phpMyAdmin screen, click Create mem table.
- Select the sample database from the list of databases on the left side of the phpMyAdmin screen in [Figure 9-9], where the database was created, and then click the [Console] menu at the bottom to open the console.

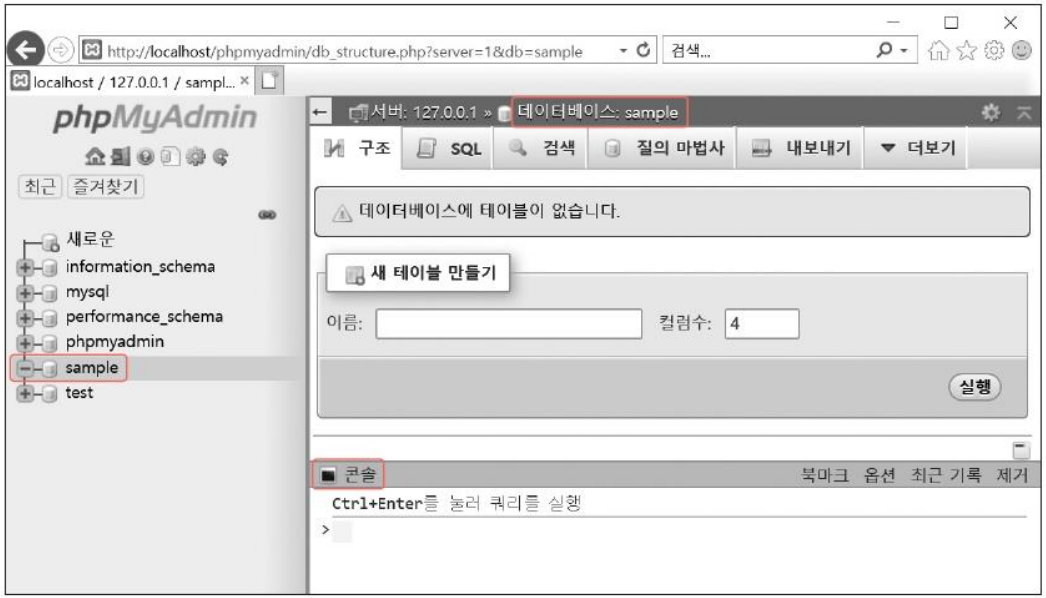

그림 9-10 phpMyAdmin 화면에서 sample 데이터베이스 선택

[TIP] Since DB tables are stored in a database, you must select a database before creating a DB table.

04 Managing Database Tables

- To create the mem table, enter the following SQL command in the phpMyAdmin console and press [Ctrl]+[S] to run.
-

```
> create table mem (
      num int not null auto_increment,
      id char(20) not null,
      pass char(20) not null,
      name char(20) not null,
      age int,
      primary key(num)
);
```

04 Managing Database Tables

- If you look at the list on the left side of the screen, you can see that the MEM table has been created under the sample database.

그림 9-11 mem 테이블 생성

04 Managing Database Tables

3. Structure of database tables

- The desc command shows the table field structure of 'table name'.

```
desc 테이블명;
```

- Command to check the structure of the mem table.

```
> desc mem;
```

04 Managing Database Tables

- The MEM table consists of five fields: num, id, pass, name, and age.
- The num, id, pass, and name fields are set to not null, and the num field is set to the primary key, auto_increment.

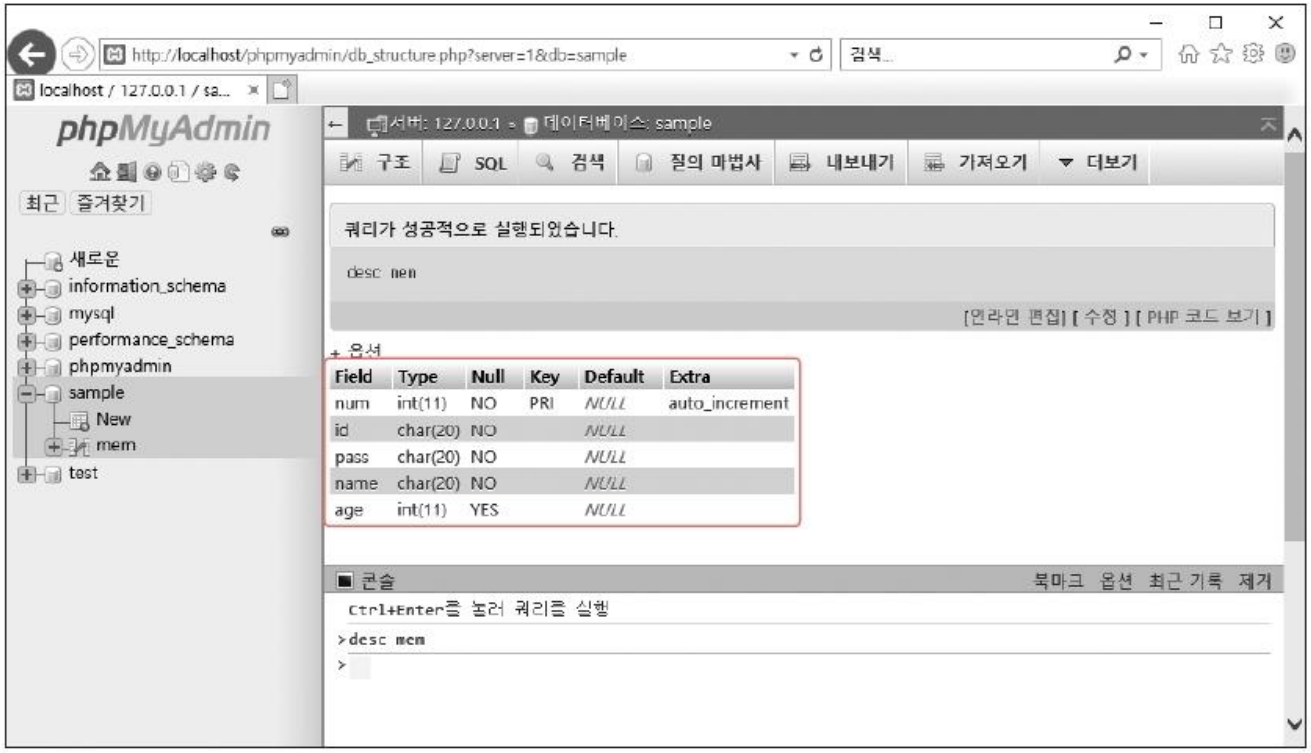

그림 9-12 mem 테이블의 구조

04 Managing Database Tables

4. Managing Database Table Fields

- **4.1 Add a new field**
- Command to add a new field to the table.
-

```
alter table 테이블명 add 새로운_필드명 필드_데이터형 [first 또는 after 필드명];
```

  - To add the email field to the MEM table as a char(30) data type, type:

```
> alter table mem add email char(30);
```

04 Managing Database Tables

그림 9-13 mem 테이블에 email 필드 추가

04 Managing Database Tables

- You can check if the email field was added correctly with the following command.

```
> desc mem;
```

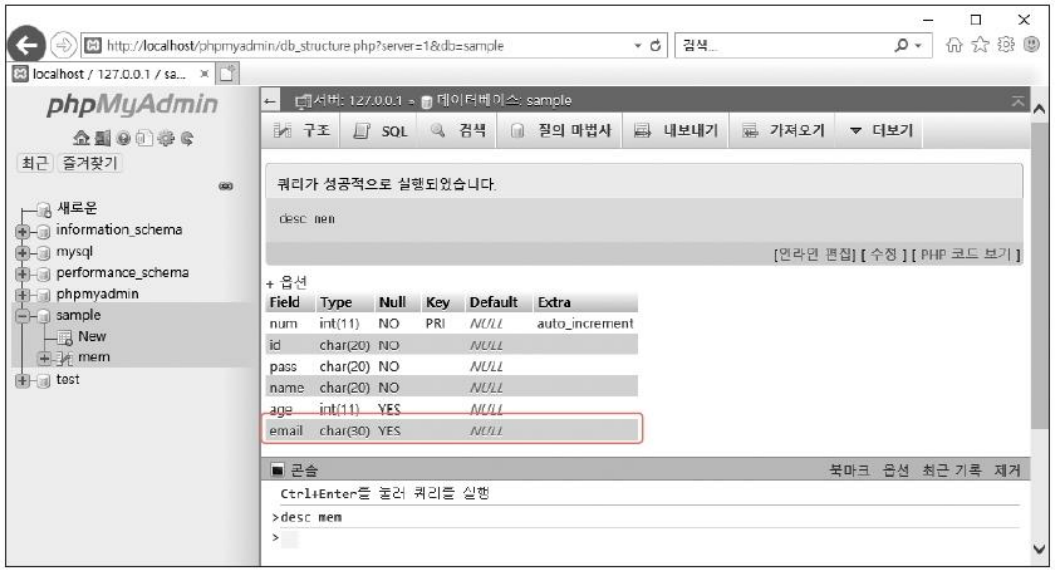

그림 9-14 mem 테이블에 추가된 email 필드 확인

04 Managing Database Tables

4.2 Delete a field

A command to delete a specific field from a table.

```
alter table 테이블명 drop 삭제할_필드명1, 삭제할_필드명2;
```

- The command to delete and check the email field from the MEM table is as follows:

```
> alter table mem drop email;
> desc mem;
```

04 Managing Database Tables

4.3 Modifying Fields

A command that modifies a specific field in a table with a new field.

```
alter table 테이블명 change 수정할_필드명 새로운_필드명 필드_데이터형;
```

- A command to change age int to phone char(20) and check the fields in the mem

```
> alter table mem change age phone char(20);
> desc mem;
```

04 Managing Database Tables

4.4 Modifying field data types

A command that modifies the data type of a specific field in a table.

```
alter table 테이블명 modify 필드명 수정할_데이터형;
```

- In the MEM table, change the data type char(20) in the phone field to int and check.
-

```
> alter table mem modify phone int;
> desc mem;
```

04 Managing Database Tables

5. Managing Database Table Names

- A command to change the name of a DB table that already exists.

```
alter table 수정할_테이블명 rename 새로운_테이블명;
```

- Rename the mem table to mem2.

```
> alter table mem rename mem2;
```

04 Managing Database Tables

- If you look at the list on the left side of the screen, there is a mem2 table under the

그림 9-15 테이블 이름을 mem에서 mem2로 변경

04 Managing Database Tables

6. Dropping a database table

Command to drop a table in a database.

```
drop table 테이블명;
```

- Command to drop the mem2 table.

```
> drop table mem2;
```

04 Managing Database Tables

- If you look at the list on the left side of the screen, the mem2 table under the sample database has been deleted and is not visible.

그림 9-16 mem2 테이블 삭제