DATABASE INTRODUCTION

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- Experiences
  - Trend Micro (Cupertino,CA,USA) - R&D Engineer
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  - Spectrum Telecorp (Merrimack,NH,USA) - Software Engineer
- Research Areas & Academia and Industry Collaboration (AIC)
  - Data Mining
  - Data Analysis
  - Internet Computing
  - Database Computing

Do a survey

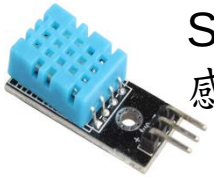
- What computer languages you have learned?
- used html ?
- Are you familiar with computer operation?
- What kind of computers you used? Ex. Windows, Mac, Linux…

Contents

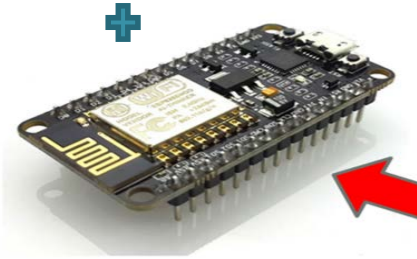
- Database Implementation
- Software Installation and Warming up

Database Implementation

The Data Flow for Server Database



Sensors
感測器



Single Chip

IOT

Internet

Server
伺服器

Database
資料庫

Cell Database
手機內嵌資料庫

PC
個人電腦
（資料庫）

Terminologies

1. Database?
2. Database Management System?
3. Database System?

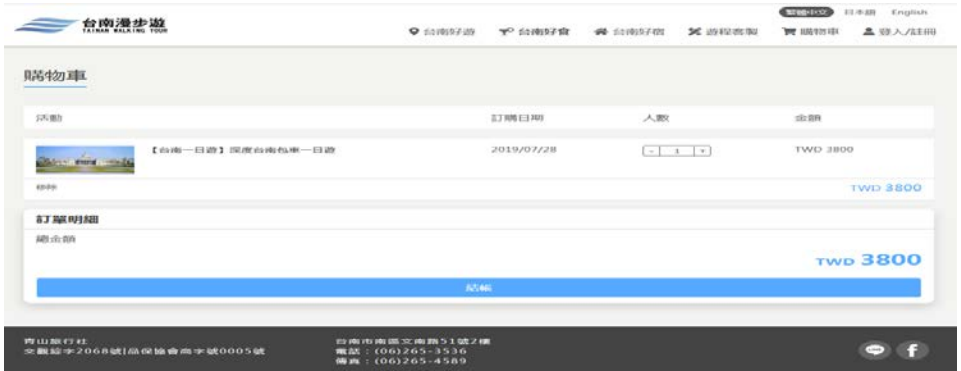
Google it and find their relationship!

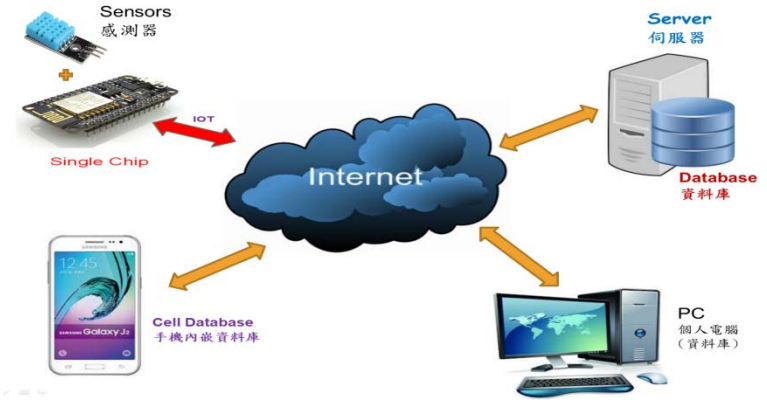
Database System

- Database system contains 3 components: Database 、Database Management System, DBMS , and application
- Database System = DBMS + Database
- http Server contains:
  - Server (including Database System)
  - Application (= php + html +CSS + JavaScript)

Database System

- The Database System is a data storage system in which users can access the data through various applications. For a company or enterprise, the benefits of using a database system are as follows:
  - It can reduce the waste of space through computerized data storage and management.
  - It can provide valuable information to users quickly.
  - Can centrally manage all company data, and by setting user authorities
  - It can reduce duplicate data, and relatively strengthen the data consistency



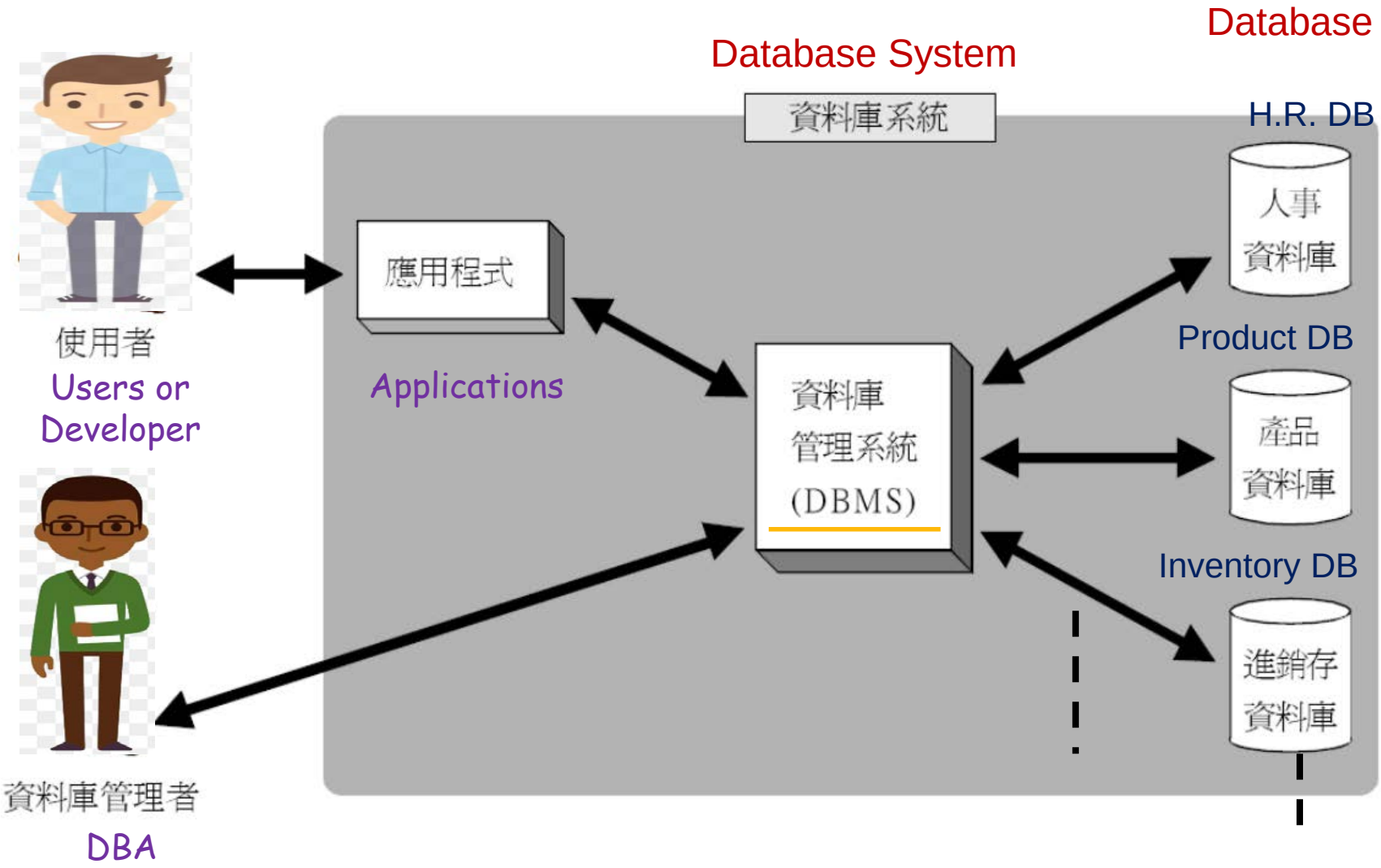


DataBase Management System(DBMS) ?

1. Access
2. MySQL
3. Oracle
4. Sysbase
5. DB2
6. MongoDB
7. SQLServer

Choose it or them! Take a guess!

Database System = DBMS + Database



資料來源:旗標公司

Four roles for Database System

There are different participants for Database system. We can roughly distinguish four types

- Database Designer □
- Database Administrator (DBA)
- Application Designer
- End user

Who get the highest authority to access databases?

Database Designer

- The database designer is responsible for the design of the entire database system, designing an appropriate format to store the data according to the user's needs; at the same time, planning the user access rights for the entire database.
- After the design is completed, it can be handed over to the database manager to manage and maintain the work.
- In general small and medium-sized enterprises, the designer and manager of the database may be the same person; if it is a large enterprise, the designer may be one group of people, and the manager is another group of people
- Sometimes, also call Database Analyzer to work out performance issues

DBA

- Therefore, the DBA must set the method and timing of database backup, and restore the database as soon as possible when the database is damaged.
- In addition, the DBA is also responsible for the account management of the database, deciding who has the right to log in to the database and who has the right to perform which actions. For example, the most basic user may only have the right to query, and the user who needs to enter data has the right to write data... and so on.

Application Designer

- Application programmers are responsible for writing client applications that access the database, allowing users to use the database through a friendly interface.□
- There are many languages that can be used to develop applications, and early programmers may use C、 php+html、 C++ or Java….
- Nowdays programmers mostly use 、 php+html 、 JAVA、 C# 、 C++、Python...

End user

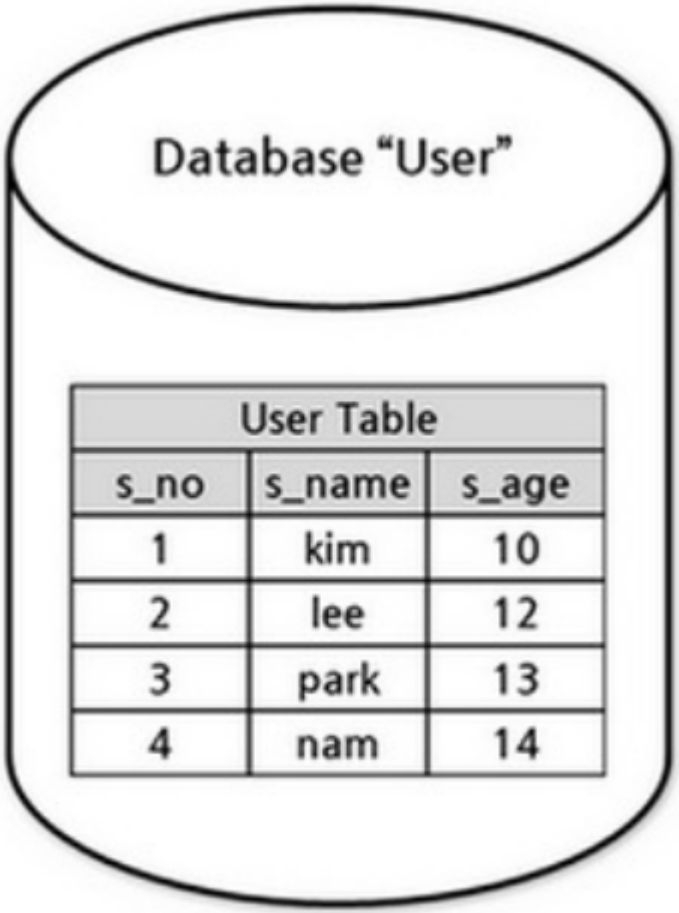
- End users are those users who really often access the database by user interfaces. They only need to learn the interface operations and do not need to worry about any problems in the maintenance or management of the database.
- If a end user encounters a problem, just ask the DBA or Engineer to deal with it.

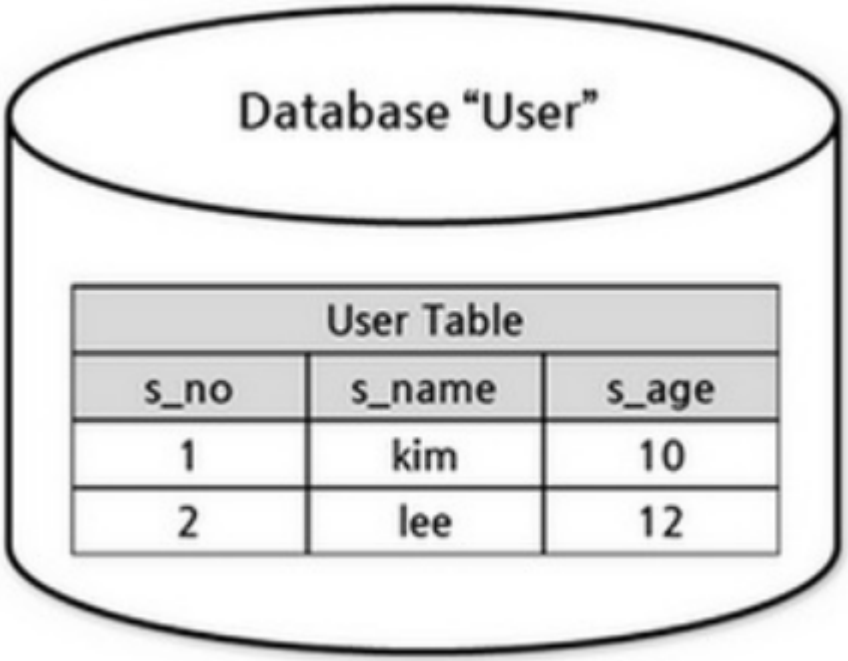
Database

- Database is a place to store data
- A Database system may contain more than one database in which is a set of data in a same category
- Generally, we think of a database as a container for storing data, but its real form is actually an electronic file
- The database can have multiple tables. Each table can have multiple columns. Each table can have multiple data records

What are the difference between database and MSword?

Examples


Database “User”
User Table
s_no
s_name
s_age
1
kim
10
2
lee
12
3
park
13
4
nam
14

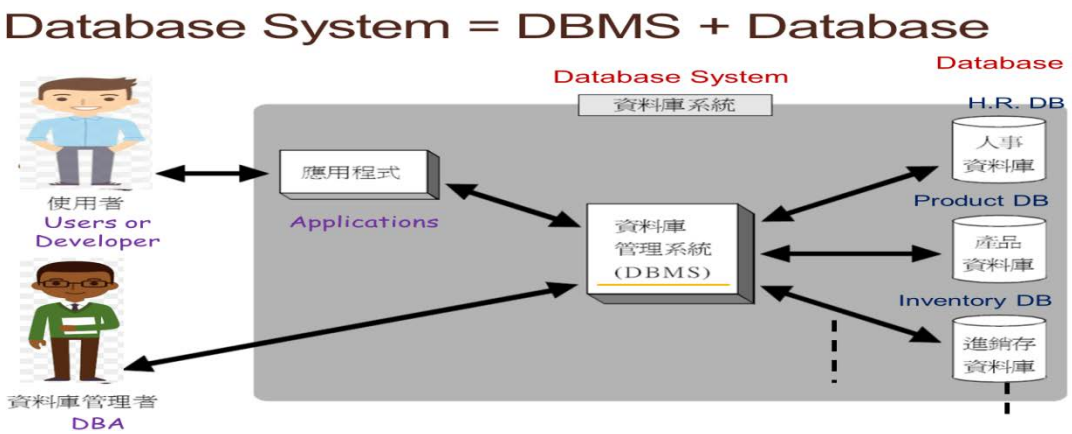

Database “User”
User Table
s_no
s_name
s_age
1
kim
10
2
lee
12

DBMS

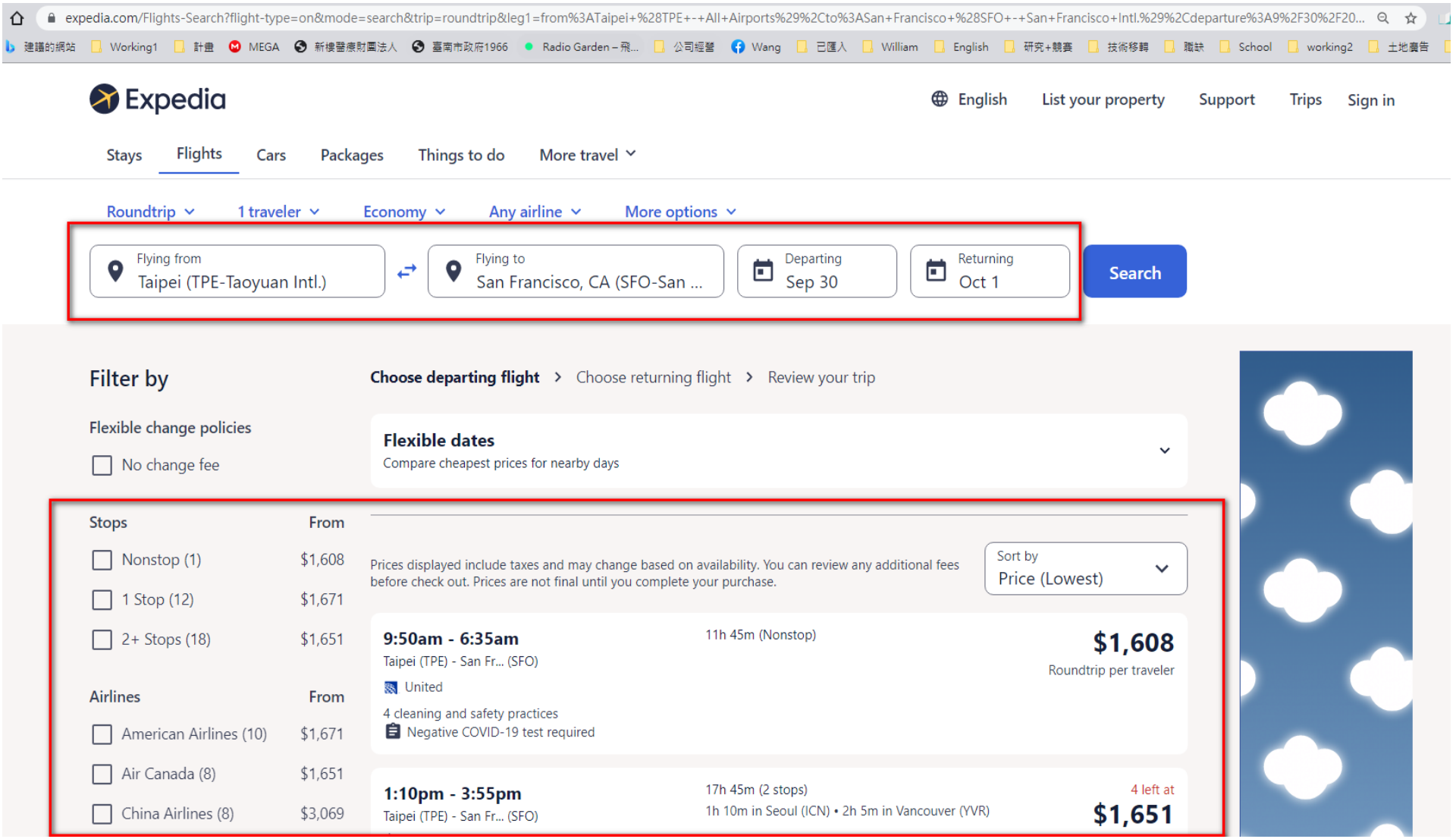
- The database management system (DBMS) refers to the software that manages the database, and is responsible for the communication between the user and the database, such as accessing the data in the database and managing various affairs for database.
- Access, SQL Server、Oracle、 SyBase、Informix、MySQL、Maria 、 PostgreSQL

Application

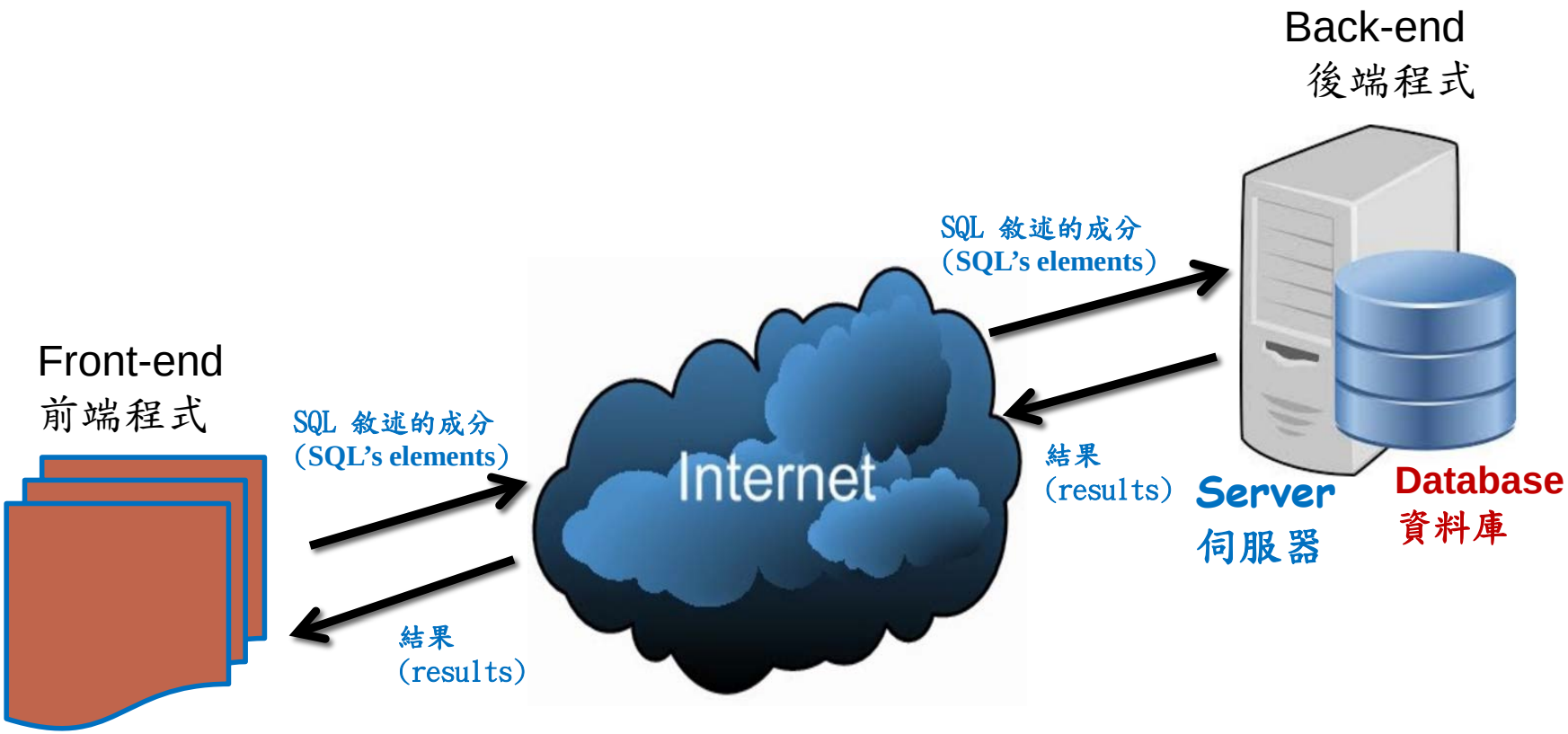
- Application programs provide a self-developed user interface. Because not every user can operate a complex database, it is necessary to provide a simpler and user-friendly operation interface through programs.
- For example, we may use JavaScript、html+php 、Java 、Python…to develop H.R and inventory applications。
- These applications must use the database management system to access and manage the data in the database



Air Ticket Booking System



The link for the frontend and backend programs

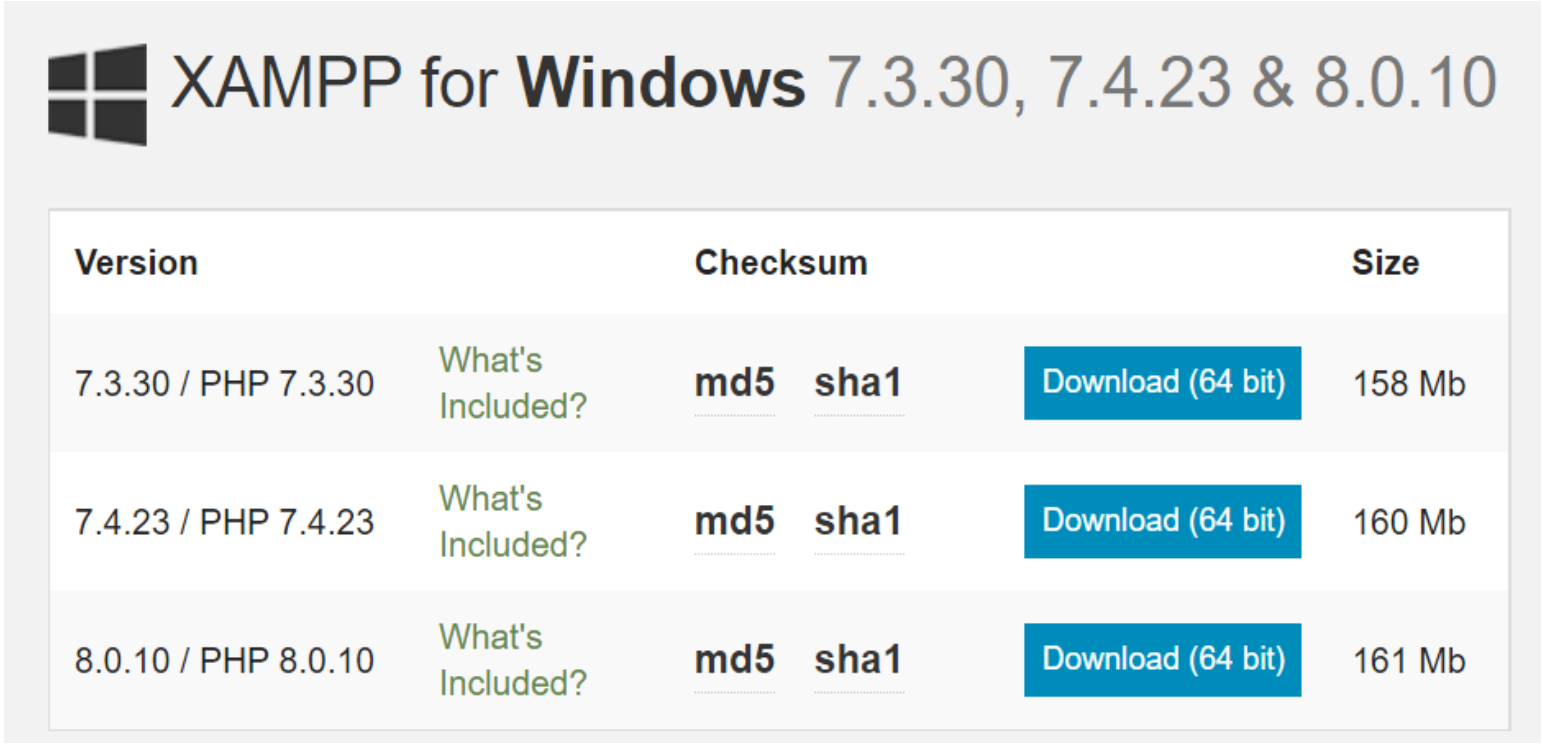


ex. Air ticket booking system

Software Installation and Warming up

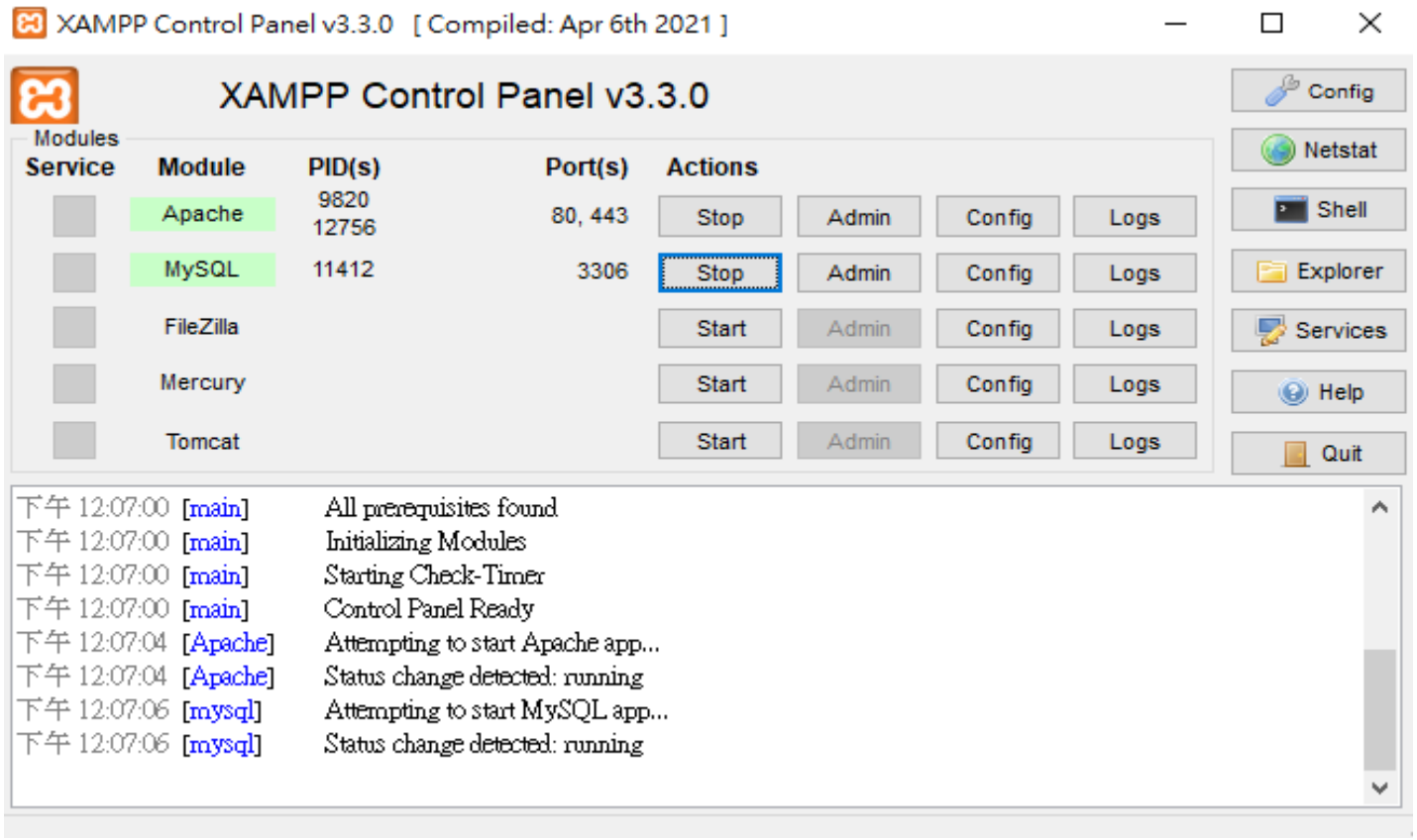
Software Installation

- XAMPP



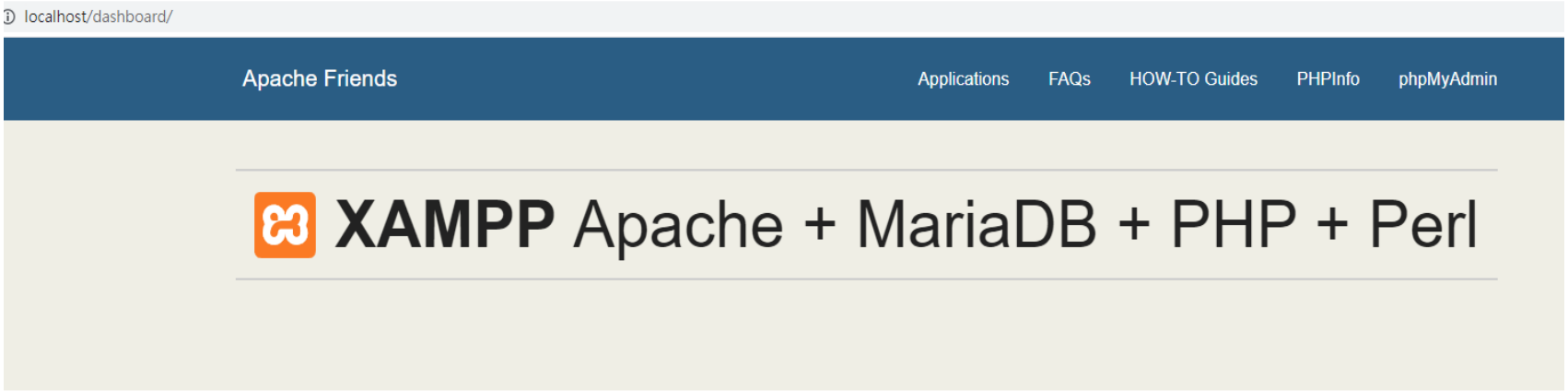
Choose one that fit in your operating system!

Startup your XAMPP



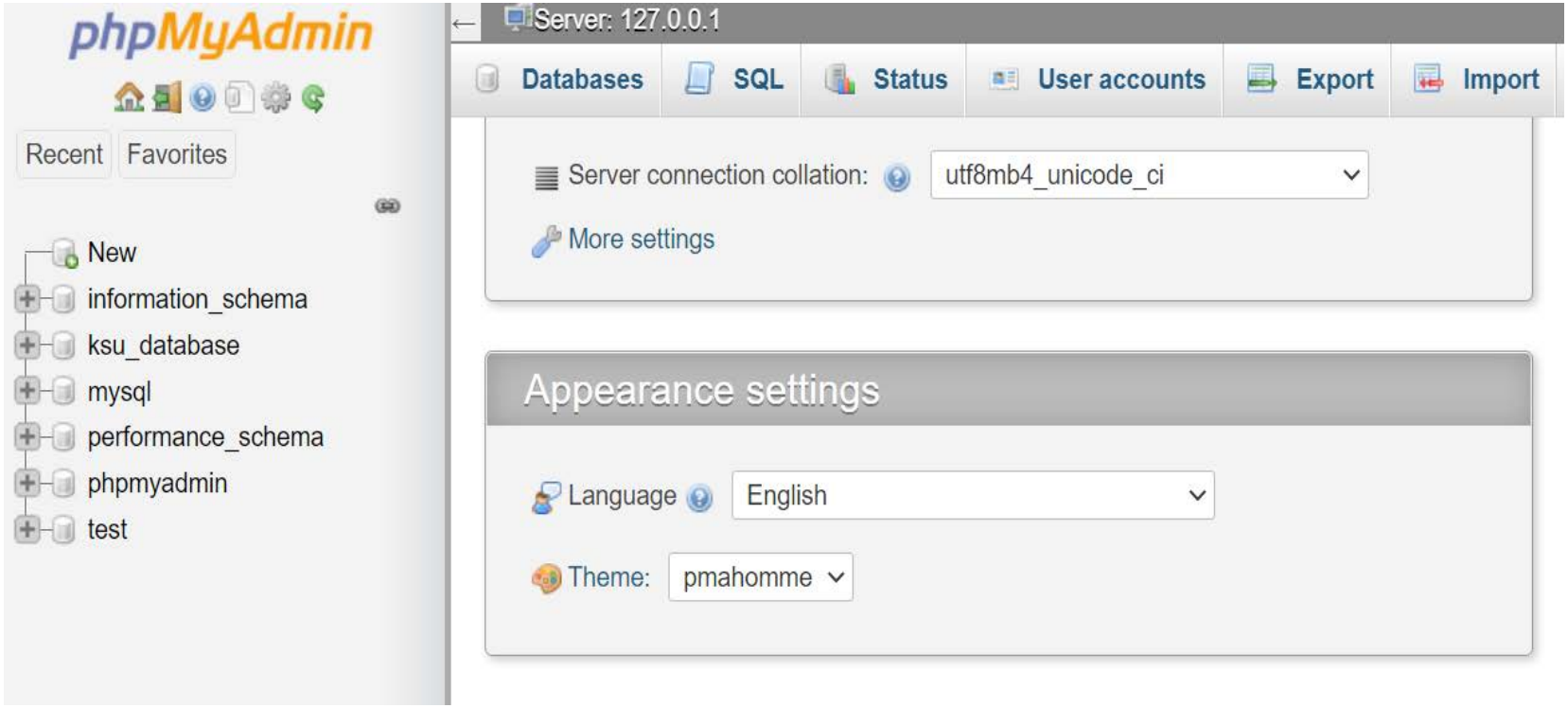
A test for your startup

- Please type “localhost” as the url of your Chrome



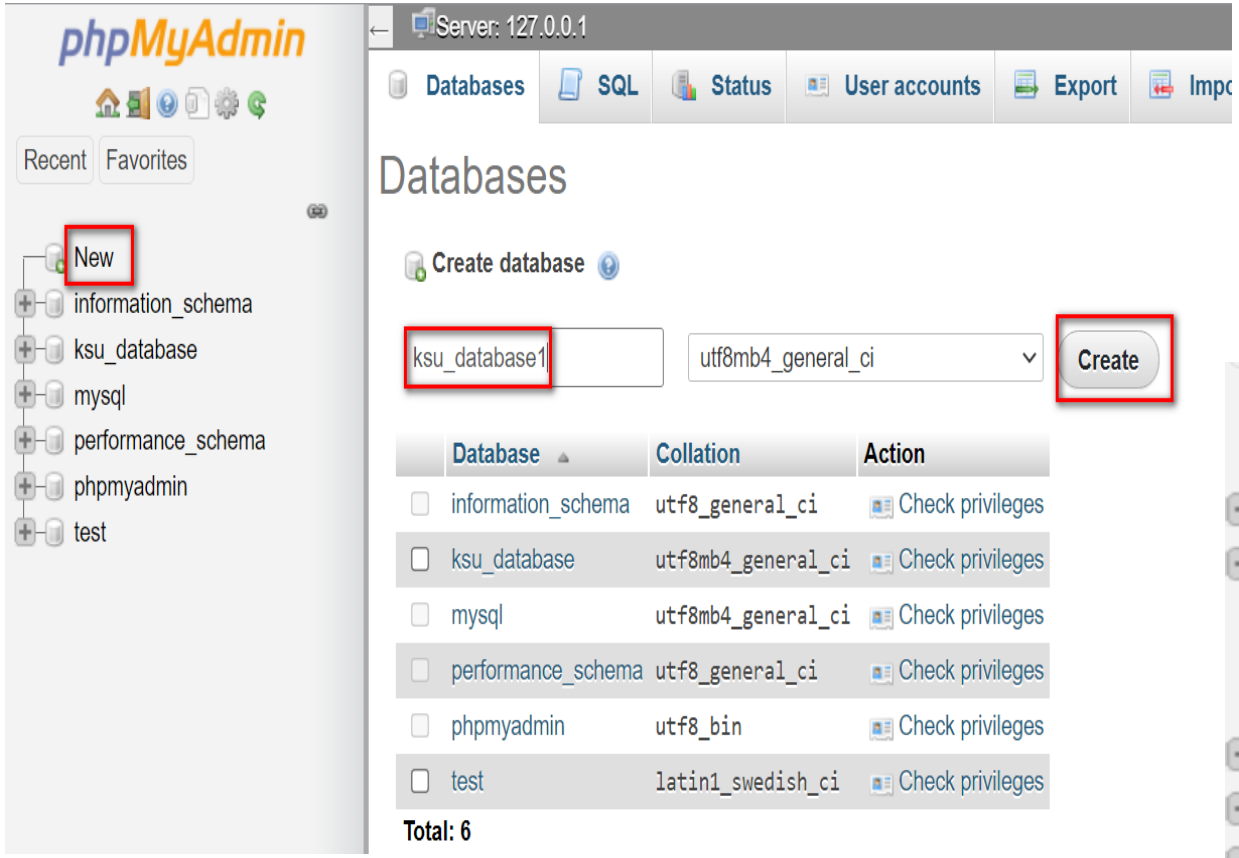
Get in phpMyadmin

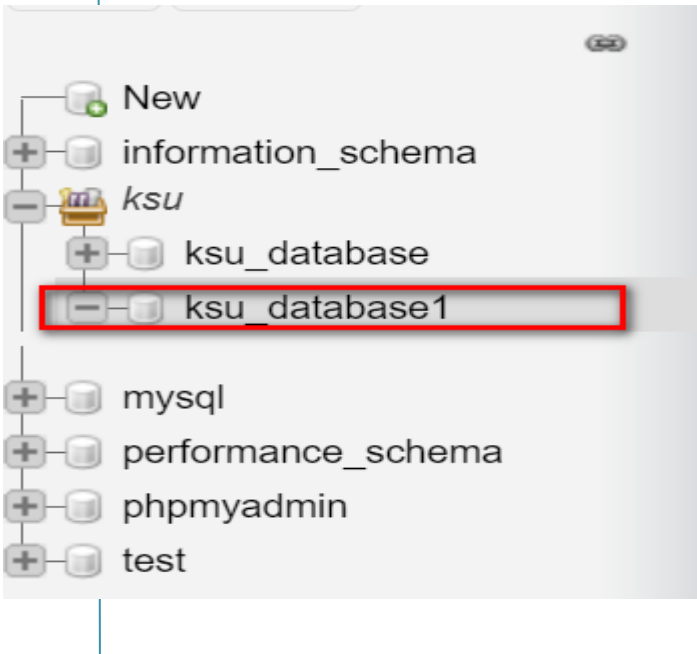
- Please type "localhost/phpmyadmin" as the url of your Chrome
- The "phpmyadmin" is a software embedded in the DBMS, "Maria".



Create a Database

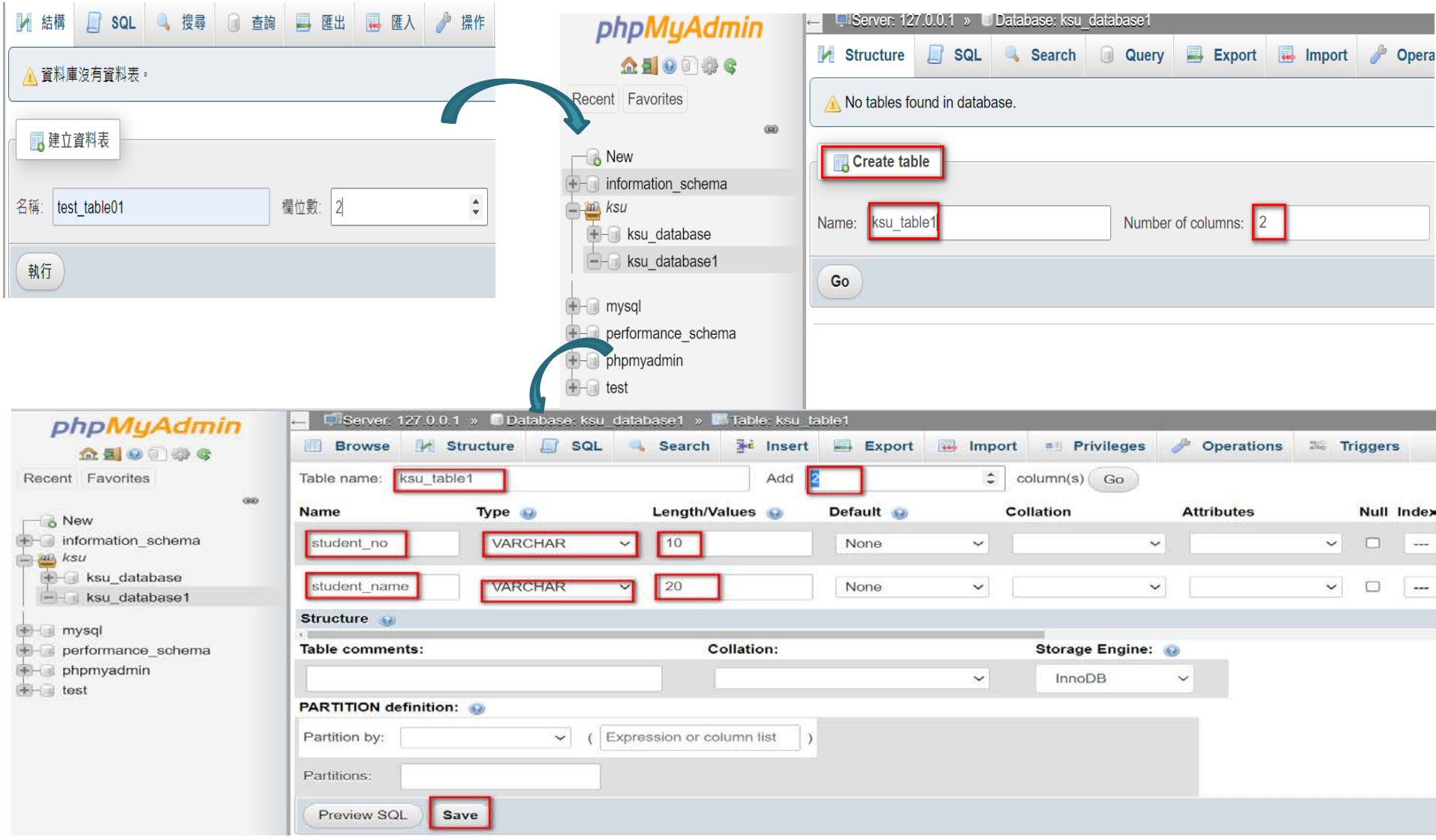
- Create a database named as "ksu_database"

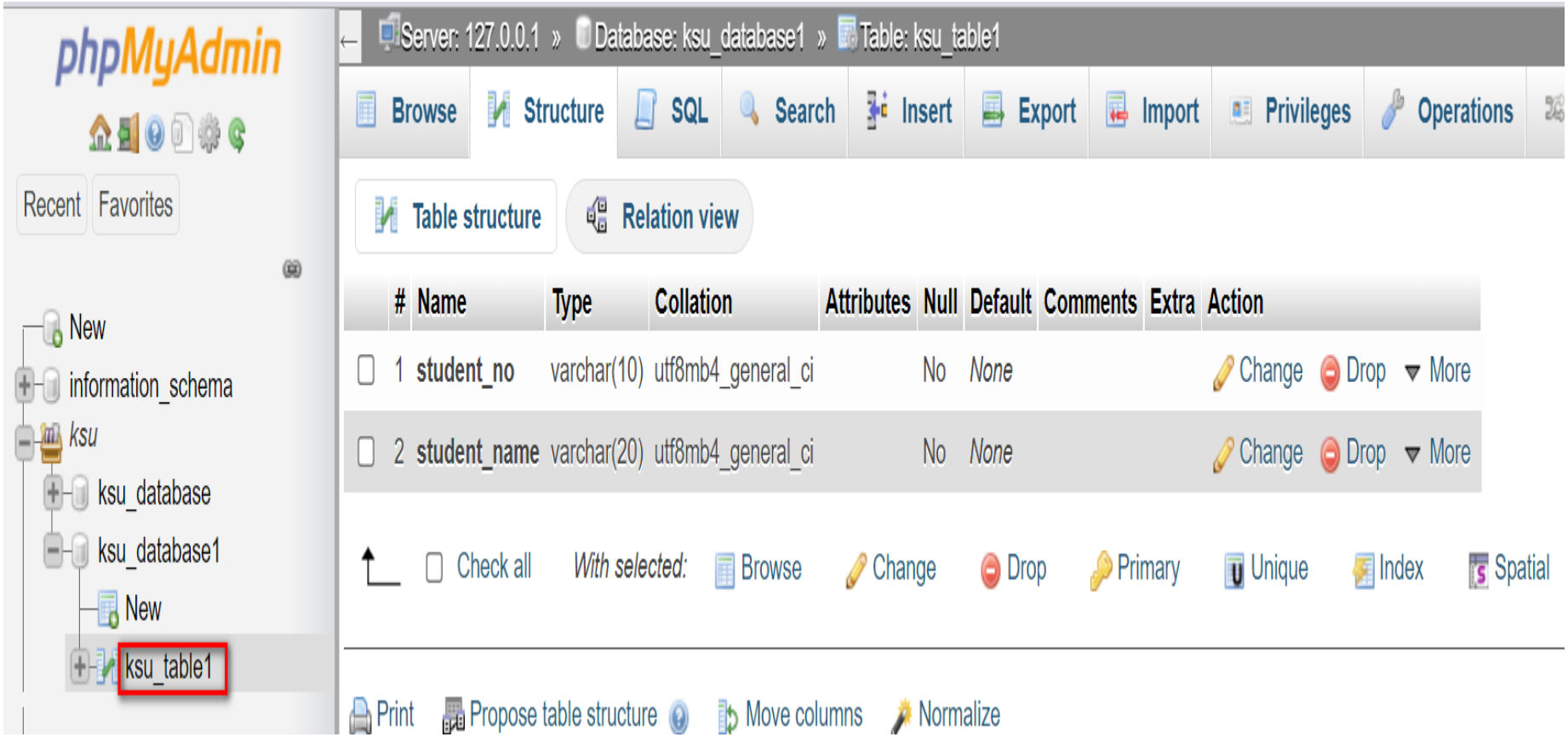




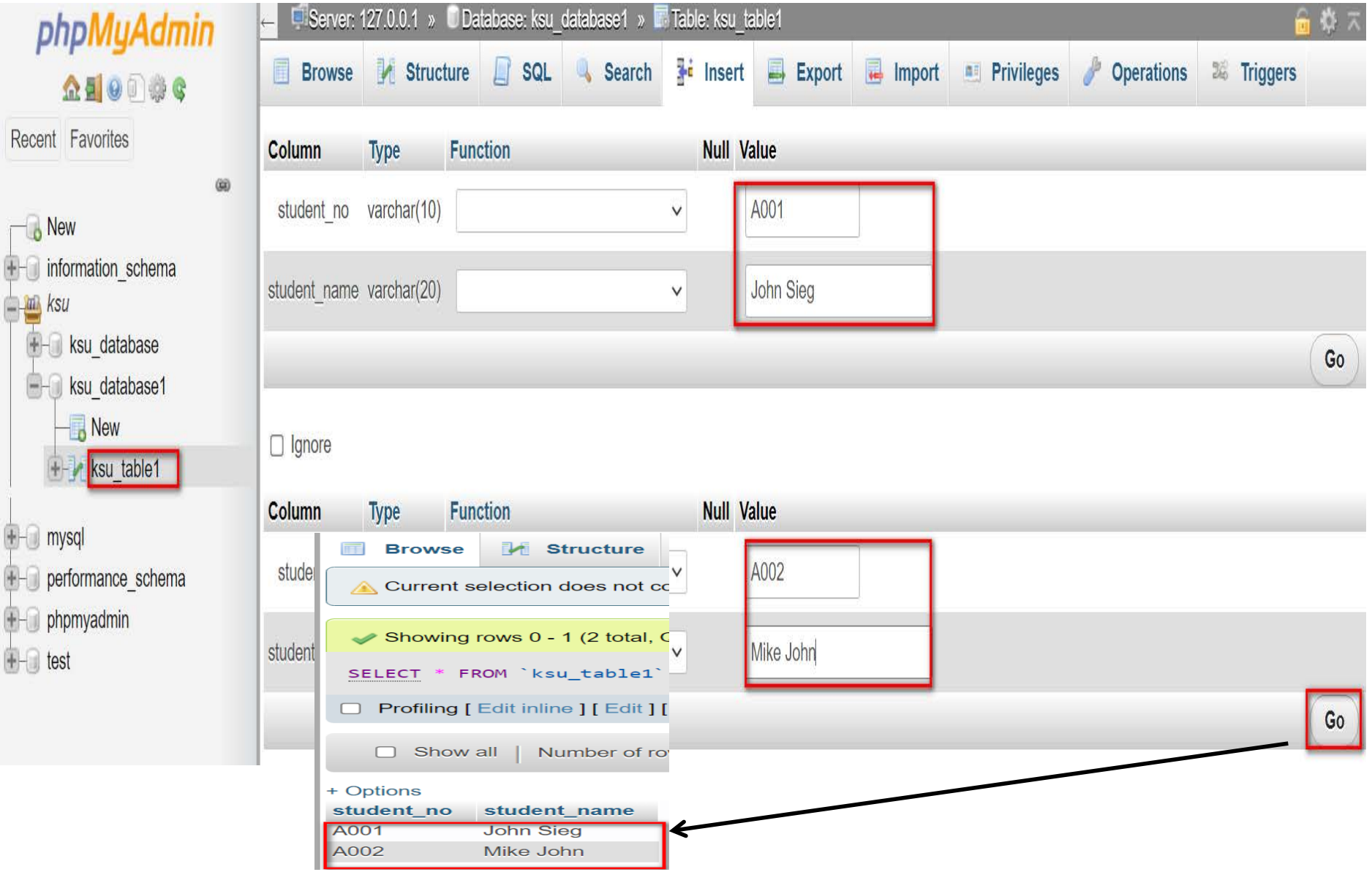
Create a Table

- Create a table with 2 columns as follows




phpMyAdmin
Recent
Favorites
New
information_schema
ksu
ksu_database
ksu_database1
New
ksu_table1
Server: 127.0.0.1 » Database: ksu_database1 » Table: ksu_table1
Browse
Structure
SQL
Search
Insert
Export
Import
Privileges
Operations
Table structure
Relation view
Name Type Collation Attributes Null Default Comments Extra Action
1 student_no varchar(10) utf8mb4_general_ci No None Change Drop More
2 student_name varchar(20) utf8mb4_general_ci No None Change Drop More
Check all
With selected:
Browse
Change
Drop
Primary
Unique
Index
Spatial
Print
Propose table structure
Move columns
Normalize

Insert Data


phpMyAdmin
Recent
Favorites
New
information_schema
ksu
ksu_database
ksu_database1
New
ksu_table1
mysql
performance_schema
phpmyadmin
test
Server: 127.0.0.1 » Database: ksu_database1 » Table: ksu_table1
Browse
Structure
SQL
Search
Insert
Export
Import
Privileges
Operations
Triggers
Column
Type
Function
Null
Value
student_no
varchar(10)
A001
student_name
varchar(20)
John Sieg
Go
Ignore
Column
Type
Function
Null
Value
Browse
Structure
Current selection does not cc
A002
Showing rows 0 - 1 (2 total, C
Mike John
SELECT * FROM `ksu_table1`
Profiling [Edit inline] [Edit] [
Go
Show all
Number of ro
+ Options
student_no
student_name
A001
John Sieg
A002
Mike John

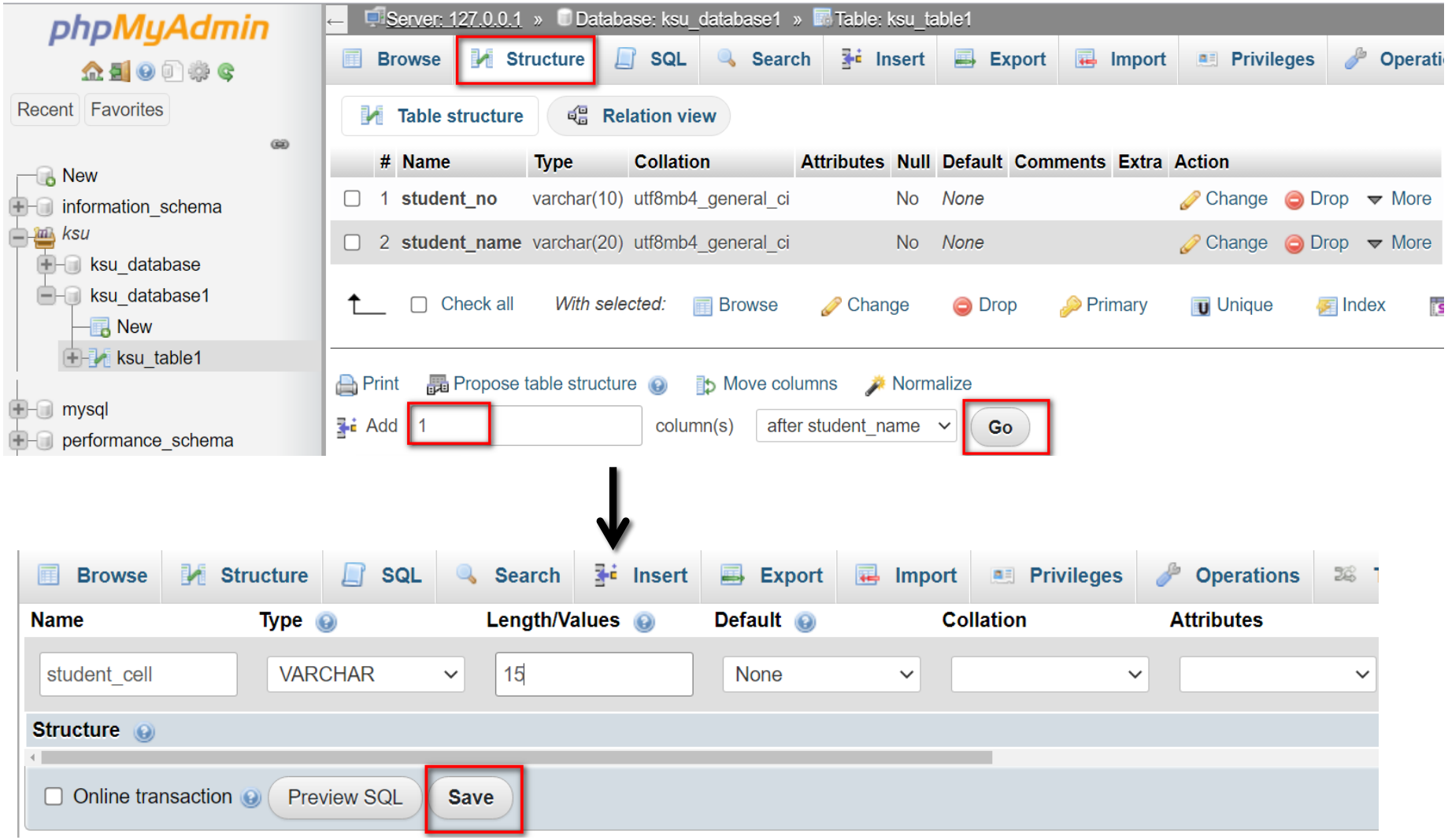
Exercise – try it out!

- Insert 4 rows as follows in your phpMyadmin interface

+ Options

student_no	student_name
A001	John Sieg
A002	Mike John
A003	Kathy Lu
A004	Derk Water

Add one more column to your table




Browse
Structure
SQL
Search
Insert
Export
Import
Privileges
Operatio
Table structure
Relation view
Name Type Collation Attributes Null Default Comments Extra Action
1 student_no varchar(10) utf8mb4_general_ci No None Change Drop More
2 student_name varchar(20) utf8mb4_general_ci No None Change Drop More
3 student_cell varchar(15) utf8mb4_general_ci No None Change Drop More

Exercise-try it out!

- Add two more columns

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	**student_no**	varchar(10)	utf8mb4_general_ci		No	*None*			Change Drop More
2	**student_name**	varchar(20)	utf8mb4_general_ci		No	*None*			Change Drop More
3	**student_cell**	varchar(15)	utf8mb4_general_ci		No	*None*			Change Drop More
4	**student_grade**	int(11)			No	60			Change Drop More
5	**student_birthday**	datetime			Yes	*NULL*			Change Drop More

Exercise-try it out!

- Add one more record

+ Options

student_no	student_name	student_cell	student_grade	student_birthday
A001	John Sieg		60	*NULL*
A002	Mike John		60	*NULL*
A003	Kathy Lu		60	*NULL*
A004	Derk Water		60	*NULL*
3001	Mice Moore	0911980765	70	2021-09-16 16:58:31

The End