

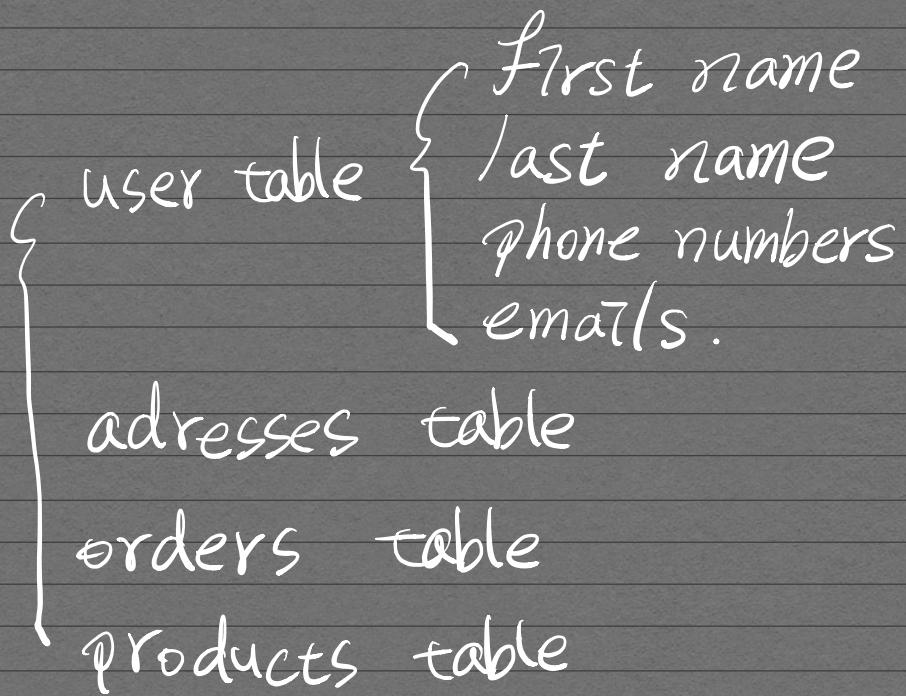
常見資料庫比較 (傳統關聯型資料庫)

→ 相對於文件型
例: MongoDB

	SQL Server	Oracle	MySQL
價格	高	最高	低
效能	CP值高	最快	中上
平台	Windows	跨	跨
語言整合	.NET	Java <small>命令行</small>	PHP <small>觸發</small> Python
可用度	Load Balancing	RAC 架構	MySQL Proxy
應用			用戶量大 搜尋、社群、新創

What is database?

A collection of data

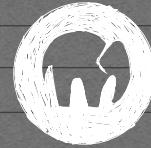


Where does MySQL come in?

Add
Remove
Modify
Search
Join

tables in a database
using code.

Env. MAMP



Step 1. Launch MAMP

- Start Servers
- Open WebStart page
- Select TOOLS tab.
- Select PHPMYADMIN
or go to localhost : 8888 /phpMyAdmin

Primary Key - A unique field in the table

Name? What if there's another the same name?

Phone Num? What if they change the number?

Give a ID would be a ideal solution .

{ Social Insurance Number

ID Number

Account Number

I. SELECT

Note: queries suppose to be the Capital letter.

The screenshot shows the phpMyAdmin interface. On the left, the database structure is displayed with the 'learning_over_here' database selected. Inside it, there are tables: 'addresses', 'orders', 'products', and 'users'. A green arrow points from the 'users' table to the SQL query window on the right. The SQL query window contains the command: 'SELECT * FROM `users`'. Below the query window, there are several buttons: 'Clear', 'Format', 'Get auto-saved query', 'Delimiter ;', and checkboxes for 'Show this query here again', 'Retain query box', and 'Rollback when finished'. A 'Go' button is at the bottom right.

SELECT * FROM `users`
all

It means select everything from users

+ Options								
	#	id	username	password	user_email	first_name	last_name	
<input type="checkbox"/>	1	quentin92	password123	business@quentinwatt.com	Quentin Watt			
<input type="checkbox"/>	2	sean	pass123	sean@socompany.co.za	Sean Socompany			
<input type="checkbox"/>	3	sibu	sibu@sibuthelegend.co.za	sibu@sibuthelegend.co.za	Sibu			
<input type="checkbox"/>	4	ryan	ryebread	ryan@thewhewe.co.za	Ryan Schwulst			
<input type="checkbox"/>	5	kristi87	krl5t!	kristi@fakemail.com	Kristi Dunsck			
<input type="checkbox"/>	6	SuzelleDIY	suzzles1989	suzelle@thedychannel.com	Suzelle			
<input type="checkbox"/>	7	jackie	thererealjackiechan	jackie@thererealjackiechan.com	Jackie Chan			
<input type="checkbox"/>	8	homer	doh!	hommer@thesimpsons.com	Homer Simpson			
<input type="checkbox"/>	9	thezuckmeister	zucker!@9)BNs	markzuckerberg@facebook.com	Mark Zuckerberg			
<input type="checkbox"/>	10	james	jamesbond007	james@m6.gov.uk	James Bond			
<input type="checkbox"/>	11	kenny	foreverdead	kenny@southpark.show	Kenny			
<input type="checkbox"/>	12	cartman	thecon!	cartman@southpark.show	Cartman			
<input type="checkbox"/>	13	greg0812	sup3rstr0ng455!	greg@fakemail.com	Greg Colman			
<input type="checkbox"/>	14	thejedimasterluke	the0rC3	lukeskywalker@thejedicouncil.galaxy	Luke Skywalker			
<input type="checkbox"/>	15	wreckitralph	imgonnawreckit!	ralph@wreck.it	Ralph			

SELECT `username`, `password` FROM `users`

Split by comma

username	password
quentin92	password123
sean	pass123
sibu	sibu
ryan	ryebread
kristi87	krl5t!
SuzelleDIY	suzzles1989
jackie	thererealjackiechan
homer	doh!

1 2 3

SELECT `first_name`, `last_name`, `id` FROM `users`

The order will affect results

+ Options		first_name	last_name	id
	#			
<input type="checkbox"/>	1	Quentin	Watt	1
<input type="checkbox"/>	2			2
<input type="checkbox"/>	3	Sibu		3
<input type="checkbox"/>	4	Ryan	Schwulst	4
<input type="checkbox"/>	5	Kristi	Dunsck	5

2. LIMIT

SELECT `product_id`, `product_name`, `product_img` FROM `products` **LIMIT 5**

Get the first five results. ↵

	product_id	product_name	product_img
<input type="checkbox"/>	1	Cannon 600D camera	imgs/products/imgname.jpg
<input type="checkbox"/>	2	Lightsaber - Blue	imgs/products/lightsaber.jpg
<input type="checkbox"/>	3	Lightsaber - Red	imgs/products/lightsaber-red.jpg
<input type="checkbox"/>	4	2017 Apple Macbook Pro - 256gb	imgs/products/macbookpro.jpg
<input type="checkbox"/>	5	Spiced Biltong - 5kg	imgs/products/spiced-biltong.jpg

3. OFFSET

SELECT `product_id`, `product_name` FROM `products` **LIMIT 4 OFFSET 5**

↑
↓
Equal

Offset (Skipped) 5 results ↵

	product_id	product_name
<input type="checkbox"/>	6	Storm Trooper Uniform
<input type="checkbox"/>	7	Pink Doughnuts
<input type="checkbox"/>	8	Nunchucks - Wooden
<input type="checkbox"/>	9	Gravestone - Granite

SELECT `product_id`, `product_name` FROM `products` **LIMIT 5,4**

offset ↪ limit ↪

4. ORDER BY

SELECT `id`, `username`, `password` FROM `users` **ORDER BY `username`** **LIMIT 6**

Make it order by username

↑ ascending

	id	username	password
<input type="checkbox"/>	12	cartman	thecoon!
<input type="checkbox"/>	13	greg0812	sup3rstr0ngp455!
<input type="checkbox"/>	8	homer	doh!
<input type="checkbox"/>	7	jackie	therealjackiechan
<input type="checkbox"/>	10	james	jamesbond007
<input type="checkbox"/>	11	kenny	foreverdead

SELECT `id`, `username` FROM `users` ORDER BY `id` DESC LIMIT 6

Opposite order ↓ descending

5. WHERE

Give a condition

```
SELECT `product_name`, `product_stock` FROM `product` WHERE `product_stock` <= 10
```

note: not equal to could be "<>" or "!="

WHERE NOT

product_name	product_stock
Cannon 600D camera	10
Lightsaber - Blue	5
Lightsaber - Red	1
Storm Trooper Uniform	5
Gravestone - Granite	4
Blue Yeti Microphone - silver	8
Hazmat Suit	2
facebook idea	1

```
SELECT * FROM `users` WHERE `username` = "sean"
```

id	username	password	user_email	first_name	last_name
2	sean	pass123	sean@hiscompany.co.za		

6. AND

```
SELECT * FROM `addresses` WHERE `state_province` = "Western Cape" AND `city` = "Cape Town";
```

address_id	users_id	address_line_1	address_line_2	address_line_3	city	state_province	zip
1	1	79 Beach Rd	Mouille Point		Cape Town	Western Cape	8005

7. OR

```
SELECT * FROM `addresses` WHERE `state_province` = "NAB" OR `state_province` = "CAL";
```

address_id	users_id	address_line_1	address_line_2	address_line_3	city	state_province	zip
7	14	Queens Palace	Naboo Main Road	Naboo City	Naboo	NAB	71992
8	12	28201 E. Bonanza St.	South Park		South Park City	CAL	28201
9	12	635 Avenue de Los Mexicanos	South Park		South Park City	CAL	28201

8. LIKE

note: wildcard (萬用字元)

% percent sign

It represents the letters which may form 0 or more.

- 'ABC%' → 'ABCD', 'ABCABC'
- '%AN%' → 'LOS ANGLE', 'SAN FRANCISCO'

_ underscore

It represents a letter.

- 'A_Z' → 'ABZ', 'AZZ' but ~~'AKKZ'~~

For instance: '_AN%' Including: 'SAN FRANCISCO'

Excluding: ~~'LOS ANGLE'~~

SELECT * FROM `products` WHERE `product_name` **LIKE** "light%";

Similar with

← ↑ →	▼	product_id	product_name	product_description	product_image	product_stock	product_price
<input type="checkbox"/>	Edit Copy Delete	2	Lightsaber - Blue		imgs/products/lightsaber.jpg	5	39999.99
<input type="checkbox"/>	Edit Copy Delete	3	Lightsaber - Red		imgs/products/lightsaber-red.jpg	1	79999.99

9. COUNT

SELECT COUNT(`product_stock`) FROM `products` WHERE `product_stock` <= 10;

note: there's no space between COUNT and ()

COUNT(`product_stock`)

8

10. SUM

```
SELECT SUM(`product_stock`) FROM `products` WHERE `product_name` LIKE "light%";  
SELECT `product_id`, `product_name`, `product_stock` FROM `products` WHERE `product_name` LIKE "light%";
```

SUM(`product_stock`)
6

← ↑ →	product_id	product_name	product_stock
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	2	Lightsaber - Blue	5
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	3	Lightsaber - Red	1

11. AVG

```
SELECT AVG(`product_price`) FROM `products`;
```

AVG(`product_price`)
9588.163846

12. INSERT INTO

```
INSERT INTO `users` (`username`, `password`, `user_email`, `first_name`, `last_name`) VALUES  
("ronch", "pa11ss", "fake@mail.com", "Ron", "Chang");
```

13. UPDATE SET

```
UPDATE `users` SET `username` = "quentin" WHERE `username` = "quentin92";
```

note: We can't update "Null" value

14. DELETE FROM

```
DELETE FROM `users` WHERE `id` >= 16 AND `id` <= 17;
```

note:

if there's no condition you might lose all the datas.

15. CREATE & DROPPING

Primary Key

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	id 📄	int(11)			No	None		AUTO_INCREMENT	Change Drop More
2	username	varchar(150)	utf8_general_ci		No	None			Change Drop More
3	password	varchar(35)	utf8_general_ci		No	None			Change Drop More
4	user_email	varchar(150)	utf8_general_ci		No	None			Change Drop More
5	first_name	varchar(150)	utf8_general_ci		Yes	NULL			Change Drop More
6	last_name	varchar(150)	utf8_general_ci		Yes	NULL			Change Drop More

255 以下
空串

不可留空

Allow to fill nothing

自動增量

CREATE TABLE `reviews`(`

review_id INT NOT NULL AUTO_INCREMENT,
 review_title VARCHAR(255) NOT NULL,
 review_description TEXT(1000) NOT NULL,
 users_id INT NOT NULL,
 product_id INT NOT NULL,
PRIMARY KEY (review_id)

)

主鍵

OPPOSITE

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	review_id 📄	int(11)			No	None		AUTO_INCREMENT	Change Drop More
2	review_title	varchar(255)	utf8_general_ci		No	None			Change Drop More
3	review_description	text	utf8_general_ci		No	None			Change Drop More
4	users_id	int(11)			No	None			Change Drop More
5	product_id	int(11)			No	None			Change Drop More

DROP TABLE `reviews`;

Remove the table

note =

It's better if you can export it to backup.

16. ALTER

新增

ALTER TABLE `users` ADD `random_column` varchar(255);

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	<input type="checkbox"/> id	int(11)			No	None		AUTO_INCREMENT	Change Drop More
2	<input type="checkbox"/> username	varchar(150)	utf8_general_ci		No	None			Change Drop More
3	<input type="checkbox"/> password	varchar(35)	utf8_general_ci		No	None			Change Drop More
4	<input type="checkbox"/> user_email	varchar(150)	utf8_general_ci		No	None			Change Drop More
5	<input type="checkbox"/> first_name	varchar(150)	utf8_general_ci		Yes	NULL			Change Drop More
6	<input type="checkbox"/> last_name	varchar(150)	utf8_general_ci		Yes	NULL			Change Drop More
7	<input type="checkbox"/> random_column	varchar(255)	utf8_general_ci		Yes	NULL			Change Drop More

修改.

ALTER TABLE `users` MODIFY `random_column` DATE;

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	<input type="checkbox"/> id	int(11)			No	None		AUTO_INCREMENT	Change Drop More
2	<input type="checkbox"/> username	varchar(150)	utf8_general_ci		No	None			Change Drop More
3	<input type="checkbox"/> password	varchar(35)	utf8_general_ci		No	None			Change Drop More
4	<input type="checkbox"/> user_email	varchar(150)	utf8_general_ci		No	None			Change Drop More
5	<input type="checkbox"/> first_name	varchar(150)	utf8_general_ci		Yes	NULL			Change Drop More
6	<input type="checkbox"/> last_name	varchar(150)	utf8_general_ci		Yes	NULL			Change Drop More
7	<input type="checkbox"/> random_column	date			Yes	NULL			Change Drop More

刪除

ALTER TABLE `users` DROP `random_column`;

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	<input type="checkbox"/> id	int(11)			No	None		AUTO_INCREMENT	Change Drop More
2	<input type="checkbox"/> username	varchar(150)	utf8_general_ci		No	None			Change Drop More
3	<input type="checkbox"/> password	varchar(35)	utf8_general_ci		No	None			Change Drop More
4	<input type="checkbox"/> user_email	varchar(150)	utf8_general_ci		No	None			Change Drop More
5	<input type="checkbox"/> first_name	varchar(150)	utf8_general_ci		Yes	NULL			Change Drop More
6	<input type="checkbox"/> last_name	varchar(150)	utf8_general_ci		Yes	NULL			Change Drop More

17. JOIN

Primary Key → id

Foreign Key → id from another table.

#	Name	Type	Collation	address_id	users_id	address_line_1
1	<input type="checkbox"/> address_id	int(11)		1	1	79 Beach Rd
2	<input type="checkbox"/> users_id	int(11)		2	15	2 Gray St
3	<input type="checkbox"/> address_line_1	varchar(250)	utf8_general_ci	3	9	Bentley Office Park
4	<input type="checkbox"/> address_line_2	varchar(250)	utf8_general_ci	4	14	Apartment 21
5	<input type="checkbox"/> address_line_3	varchar(250)	utf8_general_ci	5	10	19 Albert Embankment
6	<input type="checkbox"/> city	varchar(100)	utf8_general_ci	6	8	42 Evergreen Terrace
7	<input type="checkbox"/> state_province	varchar(100)	utf8_general_ci	7	14	Queens Palace
8	<input type="checkbox"/> zip	varchar(10)	utf8_general_ci	8	12	28201 E. Bonanza St.
				9	12	135 Avenue de Los Mexicanos

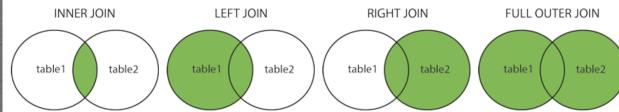
```
SELECT users.username, users.first_name, users.last_name,
addresses.address_line_1, addresses.city, addresses.state_province FROM addresses
JOIN users ON addresses.users_id = users.id;
```



Different Types of SQL JOINS

Here are the different types of the JOINs in SQL:

- **(INNER) JOIN:** Returns records that have matching values in both tables
- **LEFT (OUTER) JOIN:** Returns all records from the left table, and the matched records from the right table
- **RIGHT (OUTER) JOIN:** Returns all records from the right table, and the matched records from the left table
- **FULL (OUTER) JOIN:** Returns all records when there is a match in either left or right table



username	first_name	last_name	address_line_1	city	state_province
quentin	Quentin	Watt	79 Beach Rd	Cape Town	Western Cape
wreckitralph	Ralph		2 Gray St	Knysna	Western Cape
thezuckmeister	Mark	Zuckerberg	Bentley Office Park	Johannesburg	Gauteng
thejedimasterluke	Luke	Skywalker	Apartment 21	Tatooine Villa	Tatooine
james	James	Bond	59 Albert Embankment	London	UK
homer	Homer	Simpson	742 Evergreen Terrace	Springfield	ORE
thejedimasterluke	Luke	Skywalker	Queens Palace	Naboo	NAB
cartman	Cartman		28201 E. Bonanza St.	South Park City	CAL
cartman	Cartman		635 Avenue de Los Mexicanos	South Park City	CAL

18. ALIASES

```
SELECT orders.`order_id`, products.`product_name` FROM orders JOIN products ON
orders.product_id = products.product_id;
```

↑
equal

order_id	product_name
1	Lightsaber - Blue
2	Storm Trooper Uniform
3	facebook idea
4	Hazmat Suit

```
SELECT o.`order_id`, p.`product_name` FROM orders AS o JOIN products AS p ON
o.product_id = p.product_id;
```

19. PRIMARY & FOREIGN KEY

Example:

```
CREATE TABLE Orders(
    OrderID int NOT NULL,
    OrderNumber int NOT NULL,
    PersonID int,
    PRIMARY KEY (OrderID),
    FOREIGN KEY (PersonID) REFERENCES Persons(PersonID)
);
```

```
ALTER TABLE orders ADD FOREIGN KEY (product_id) REFERENCES products(product_id);
```

	order_id	product_id	user_id	address_id
<input type="checkbox"/>	1	2	14	7
<input type="checkbox"/>	2	6	14	7
<input type="checkbox"/>	3	13	9	1
<input checked="" type="checkbox"/>	4	12	8	6

Create a reference link.

	product_id	product_name	product_description
<input type="checkbox"/>	12	Hazmat Suit	Lore ipsum dolor sit amet, consectetur adipiscing...

remove foreign key

```
ALTER TABLE orders DROP FOREIGN KEY orders_ibfk_1;
```

The screenshot shows the MySQL Workbench interface with the 'Foreign key constraints' section highlighted. A red arrow points from the 'orders_ibfk_1' constraint name to the 'ON DELETE' dropdown menu, which is currently set to 'RESTRICT'. Below the dropdown, there is another row for 'ON UPDATE' also set to 'RESTRICT'.

unlinked!

	order_id	product_id	user_id	address_id
<input type="checkbox"/>	1	2	14	7
<input type="checkbox"/>	2	6	14	7
<input type="checkbox"/>	3	13	9	1
<input type="checkbox"/>	4	12	8	6