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MySQL

<https://www.w3schools.com/mysql/default.asp>

What is MySQL?

- MySQL is a relational database management system
- MySQL is open-source
- MySQL is free
- MySQL is ideal for both small and large applications
- MySQL is very fast, reliable, scalable, and easy to use
- MySQL is cross-platform
- MySQL is compliant with the ANSI SQL standard
- MySQL was first released in 1995
- MySQL is developed, distributed, and supported by Oracle Corporation
- MySQL is named after co-founder Monty Widenius's daughter: My

What is RDBMS?



RDBMS stands for Relational Database Management System.

RDBMS is a program used to maintain a relational database.

RDBMS is the basis for all modern database systems such as MySQL, Microsoft SQL Server, Oracle, and Microsoft Access.

RDBMS uses SQL queries to access the data in the database.

What is a Database Table?

A table is a collection of related data entries, and it consists of columns and rows.

A column holds specific information about every record in the table.

A record (or row) is each individual entry that exists in a table.

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
1	Alfreds Futterkiste	Maria Anders	Obere Str. 57	Berlin	12209	Germany
2	Ana Trujillo Emparedados y helados	Ana Trujillo	Avda. de la Constitución 2222	México D.F.	05021	Mexico
3	Antonio Moreno Taquería	Antonio Moreno	Mataderos 2312	México D.F.	05023	Mexico
4	Around the Horn	Thomas Hardy	120 Hanover Sq.	London	WA1 1DP	UK
5	Berglunds snabbköp	Christina Berglund	Berguvsvägen 8	Luleå	S-958 22	Sweden

Northwind "Customers" table

What is a Relational Database?

A relational database defines database relationships in the form of tables. The tables are related to each other - based on data common to each.

Customers Table

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
1	Alfreds Futterkiste	Maria Anders	Obere Str. 57	Berlin	12209	Germany
2	Ana Trujillo Emparedados y helados	Ana Trujillo	Avda. de la Constitución 2222	México D.F.	05021	Mexico
3	Antonio Moreno Taquería	Antonio Moreno	Mataderos 2312	México D.F.	05023	Mexico
4	Around the Horn	Thomas Hardy	120 Hanover Sq.	London	WA1 1DP	UK
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Orders Table

The relationship between the "Customers" table and the "Orders" table is the CustomerID column:

OrderID	CustomerID	EmployeeID	OrderDate	ShipperID
10278	5	8	1996-08-12	2
10280	5	2	1996-08-14	1
10308	2	7	1996-09-18	3
10355	4	6	1996-11-15	1
10365	3	3	1996-11-27	2
10383	4	8	1996-12-16	3
10384	5	3	1996-12-16	3

The relationship between the "Orders" table and the "Shippers" table is the ShipperID column:

Shippers Table

ShipperID	ShipperName	Phone
1	Speedy Express	(503) 555-9831
2	United Package	(503) 555-3199
3	Federal Shipping	(503) 555-9931

```
SELECT Customers.CustomerID, Customers.CustomerName, Orders.OrderID
From Customers INNER JOIN Orders
ON Customers.CustomerID=Orders.CustomerID;
```

5	Berglunds snabbköp	10278
44	Lehmanna Marktstand	10279
5	Berglunds snabbköp	10280

Make 3 tables – Customers, Orders, Shippers using W3Schools MySQL Site.

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
1	Alfreds Futterkiste	Maria Anders	Obere Str. 57	Berlin	12209	Germany
2	Ana Trujillo Emparedados y helados	Ana Trujillo	Avda. de la Constitución 2222	México D.F.	05021	Mexico
3	Antonio Moreno Taquería	Antonio Moreno	Mataderos 2312	México D.F.	05023	Mexico
4	Around the Horn	Thomas Hardy	120 Hanover Sq.	London	WA1 1DP	UK
5	Berglunds snabbköp	Christina Berglund	Berguvsvägen 8	Luleå	S-958 22	Sweden

Orders Table				
OrderID	CustomerID	EmployeeID	OrderDate	ShipperID
10278	5	8	1996-08-12	2
10280	5	2	1996-08-14	1
10308	2	7	1996-09-18	3
10355	4	6	1996-11-15	1
10365	3	3	1996-11-27	2
10383	4	8	1996-12-16	3
10384	5	3	1996-12-16	3

Shippers Table		
ShipperID	ShipperName	Phone
1	Speedy Express	(503) 555-9831
2	United Package	(503) 555-3199
3	Federal Shipping	(503) 555-9931

The following SQL statement selects all the records in the "Customers" table:

Example

```
SELECT * FROM Customers;
```

https://www.w3schools.com/sql/sql_select.asp

```
SELECT * FROM Customers;
```

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행 필터링:

Sort by key: 없음

+ 옵션

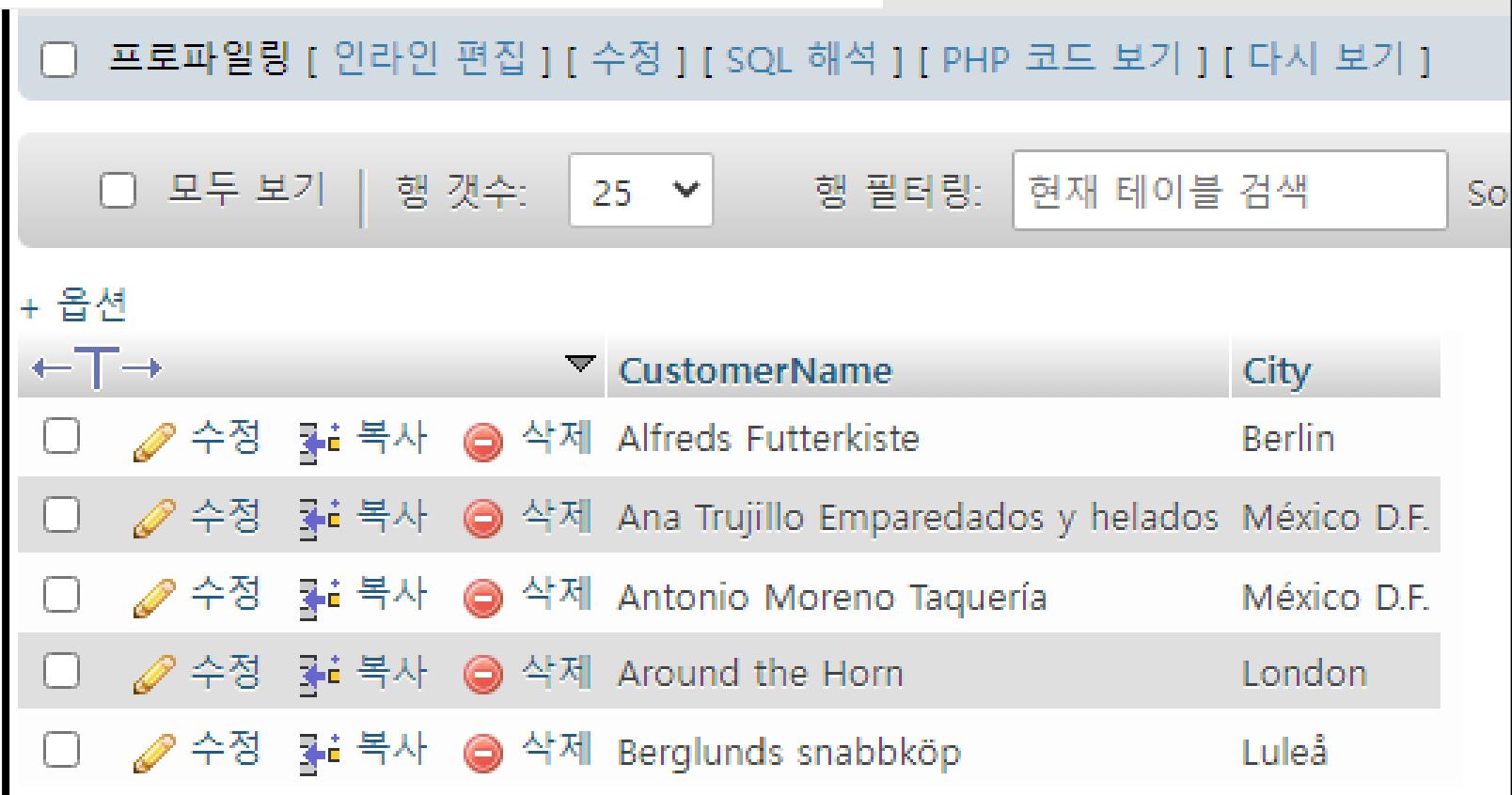
				CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
<input type="checkbox"/>				1	Alfreds Futterkiste	Maria Anders	Obere Str. 57	Berlin	12209	Germany
<input type="checkbox"/>				2	Ana Trujillo Emparedados y helados	Ana Trujillo	Avda. de la Constitución 2222	México D.F. 05021		Mexico
<input type="checkbox"/>				3	Antonio Moreno Taquería	Antonio Moreno	Mataderos 2312	México D.F. 05023		Mexico
<input type="checkbox"/>				4	Around the Horn	Thomas Hardy	120 Hanover Sq.	London	WA1 1DP	UK
<input type="checkbox"/>				5	Berglunds snabbköp	Christina Berglund	Berguvsvägen 8	Luleå	S-958 22	Sweden

SELECT Column Example

The following SQL statement selects the "CustomerName" and "City" columns from the "Customers" table:

Example

```
SELECT CustomerName, City FROM Customers;
```



The screenshot shows a MySQL Workbench interface with the following details:

- Toolbar:** Includes options for "프로파일링" (Profiling), "인라인 편집" (Inline Edit), "수정" (Edit), "SQL 해석" (Parse SQL), "PHP 코드 보기" (View PHP code), and "다시 보기" (Redo).
- Filter Bar:** Contains a checkbox for "모두 보기" (View all), a dropdown for "행 갯수" (Row count) set to 25, a "행 필터링" (Row filtering) button, and a "현재 테이블 검색" (Search current table) input field.
- Table Header:** Shows the columns "CustomerName" and "City".
- Data Rows:** Five rows of customer data are listed:
 - Alfreds Futterkiste, Berlin
 - Ana Trujillo Emparedados y helados, México D.F.
 - Antonio Moreno Taquería, México D.F.
 - Around the Horn, London
 - Berglunds snabbköp, Luleå
- Action Buttons:** Each row has edit (pencil), copy (blue square), and delete (red minus) buttons.

SELECT Example Without DISTINCT

The following SQL statement selects all (including the duplicates) values from the "Country" column in the "Customers" table:

```
SELECT Country FROM Customers;
```

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[+ 옵션](#)
[Country](#)

<input type="checkbox"/>		수정		복사		삭제	Germany
<input type="checkbox"/>		수정		복사		삭제	Mexico
<input type="checkbox"/>		수정		복사		삭제	Mexico
<input type="checkbox"/>		수정		복사		삭제	UK
<input type="checkbox"/>		수정		복사		삭제	Sweden

SELECT DISTINCT Examples

The following SQL statement selects only the DISTINCT values from the "Country" column in the "Customers" table:

```
SELECT DISTINCT Country FROM Customers;
```

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[+ 옵션](#)
[Country](#)

<input type="checkbox"/>		수정		복사		삭제	Germany
<input type="checkbox"/>		수정		복사		삭제	Mexico
<input type="checkbox"/>		수정		복사		삭제	UK
<input type="checkbox"/>		수정		복사		삭제	Sweden

```
SELECT COUNT(DISTINCT Country) FROM Customers;
```

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+ 옵션

COUNT(DISTINCT Country)

4

The **WHERE** clause is used to filter records.

It is used to extract only those records that fulfill a specified condition.

The following SQL statement selects all the customers from the country "Mexico", in the "Customers" table:

```
SELECT * FROM Customers WHERE Country='Mexico';
```

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Sort by key:

[없음](#)

+ 옵션

[←](#) [→](#)

[▼](#)

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
2	Ana Trujillo Emparedados y helados	Ana Trujillo	Avda. de la Constitución 2222	México D.F.	05021	Mexico
3	Antonio Moreno Taquería	Antonio Moreno	Mataderos 2312	México D.F.	05023	Mexico

[수정](#)  [삭제](#) 2

Ana Trujillo Emparedados y helados

Ana Trujillo

Avda. de la Constitución 2222

México D.F. 05021

Mexico

[수정](#)  [삭제](#) 3

Antonio Moreno Taquería

Antonio Moreno

Mataderos 2312

México D.F. 05023

Mexico

https://www.w3schools.com/sql/sql_where.asp

Operators in The WHERE Clause

The following operators can be used in the **WHERE** clause:

Operator	Description
=	Equal
>	Greater than
<	Less than
>=	Greater than or equal
<=	Less than or equal
<>	Not equal. Note: In some versions of SQL this operator may be written as !=
BETWEEN	Between a certain range
LIKE	Search for a pattern
IN	To specify multiple possible values for a column

<pre>SELECT * FROM Customers WHERE Country='Germany' AND City='Berlin';</pre>						
<input type="checkbox"/> 프로파일링 [인라인 편집] [수정] [SQL 해석] [PHP 코드 보기] [다시 보기]						
<input type="checkbox"/> 모두 보기		행 갯수:	25	행 필터링: 현재 테이블 검색		
+ 옵션						
<input type="button" value="←"/> <input type="button" value="→"/>	<input type="button" value="CustomerID"/>	<input type="button" value="CustomerName"/>	<input type="button" value="ContactName"/>	<input type="button" value="Address"/>	<input type="button" value="City"/>	<input type="button" value="PostalCode"/>
<input type="checkbox"/> 수정 <input type="button" value="복사"/> <input type="radio"/> 삭제 1	Alfreds Futterkiste	Maria Anders	Obere Str. 57	Berlin	12209	Germany

<pre>SELECT * FROM Customers WHERE Country='Germany' AND (City='Berlin' OR City='München');</pre>						
<input type="checkbox"/> 프로파일링 [인라인 편집] [수정] [SQL 해석] [PHP 코드 보기] [다시 보기]						
<input type="checkbox"/> 모두 보기		행 갯수:	25	행 필터링: 현재 테이블 검색		
+ 옵션						
<input type="button" value="←"/> <input type="button" value="→"/>	<input type="button" value="CustomerID"/>	<input type="button" value="CustomerName"/>	<input type="button" value="ContactName"/>	<input type="button" value="Address"/>	<input type="button" value="City"/>	<input type="button" value="PostalCode"/>
<input type="checkbox"/> 수정 <input type="button" value="복사"/> <input type="radio"/> 삭제 1	Alfreds Futterkiste	Maria Anders	Obere Str. 57	Berlin	12209	Germany

```
SELECT * FROM Customers WHERE NOT Country='Germany' AND NOT Country='USA';
```

프로파일링 [인라인 편집] [수정] [SQL 해석] [PHP 코드 보기] [다시 보기]

모두 보기 | 행 갯수: 25 ▾

행 필터링: 현재 테이블 검색

Sort by key: 없음 ▾

+ 옵션

	← T →	CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
<input type="checkbox"/>	 수정  복사  삭제 2		Ana Trujillo Emparedados y helados	Ana Trujillo	Avda. de la Constitución 2222	México D.F.	05021	Mexico
<input type="checkbox"/>	 수정  복사  삭제 3		Antonio Moreno Taquería	Antonio Moreno	Mataderos 2312	México D.F.	05023	Mexico
<input type="checkbox"/>	 수정  복사  삭제 4		Around the Horn	Thomas Hardy	120 Hanover Sq.	London	WA1 1DP	UK
<input type="checkbox"/>	 수정  복사  삭제 5		Berglunds snabbköp	Christina Berglund	Berguvsvägen 8	Luleå	S-958 22	Sweden

```
SELECT * FROM Customers ORDER BY Country DESC;
```



프로파일링 [인라인 편집] [수정] [SQL 해석] [PHP 코드 보기] [다시 보기]

모두 보기 | 행 갯수: 25

행 필터링: 현재 테이블 검색

Sort by key: 없음

+ 옵션

	CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
<input type="checkbox"/>	수정 복사 삭제 4	Around the Horn	Thomas Hardy	120 Hanover Sq.	London	WA1 1DP	UK
<input type="checkbox"/>	수정 복사 삭제 5	Berglunds snabbköp	Christina Berglund	Berguvsvägen 8	Luleå	S-958 22	Sweden
<input type="checkbox"/>	수정 복사 삭제 2	Ana Trujillo Emparedados y helados	Ana Trujillo	Avda. de la Constitución 2222	México D.F. 05021		Mexico
<input type="checkbox"/>	수정 복사 삭제 3	Antonio Moreno Taquería	Antonio Moreno	Mataderos 2312	México D.F. 05023		Mexico
<input type="checkbox"/>	수정 복사 삭제 1	Alfreds Futterkiste	Maria Anders	Obere Str. 57	Berlin	12209	Germany

```
SELECT * FROM Customers ORDER BY Country, CustomerName;
```

프로파일링 [인라인 편집] [수정] [SQL 해석] [PHP 코드 보기] [다시 보기]

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행 필터링: 현재 테이블 검색

Sort by key: 없음

- 옵션

	CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
<input type="checkbox"/>	수정 복사 삭제 1	Alfreds Futterkiste	Maria Anders	Obere Str. 57	Berlin	12209	Germany
<input type="checkbox"/>	수정 복사 삭제 2	Ana Trujillo Emparedados y helados	Ana Trujillo	Avda. de la Constitución 2222	México D.F. 05021		Mexico
<input type="checkbox"/>	수정 복사 삭제 3	Antonio Moreno Taquería	Antonio Moreno	Mataderos 2312	México D.F. 05023		Mexico
<input type="checkbox"/>	수정 복사 삭제 5	Berglunds snabbköp	Christina Berglund	Berguvsvägen 8	Luleå	S-958 22	Sweden
<input type="checkbox"/>	수정 복사 삭제 4	Around the Horn	Thomas Hardy	120 Hanover Sq.	London	WA1 1DP	UK



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```
SELECT * FROM Customers ORDER BY Country ASC, CustomerName DESC;
```



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행 갯수: 25

행 필터링: 현재 테이블 검색

Sort by key:

없음



University Network Member

+ 옵션

	← ↑ →	CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
<input type="checkbox"/>	수정 복사 삭제	1	Alfreds Futterkiste	Maria Anders	Obere Str. 57	Berlin	12209	Germany
<input type="checkbox"/>	수정 복사 삭제	3	Antonio Moreno Taquería	Antonio Moreno	Mataderos 2312	México D.F. 05023		Mexico
<input type="checkbox"/>	수정 복사 삭제	2	Ana Trujillo Emparedados y helados	Ana Trujillo	Avda. de la Constitución 2222	México D.F. 05021		Mexico
<input type="checkbox"/>	수정 복사 삭제	5	Berglunds snabbköp	Christina Berglund	Berguvsvägen 8	Luleå	S-958 22	Sweden
<input type="checkbox"/>	수정 복사 삭제	4	Around the Horn	Thomas Hardy	120 Hanover Sq.	London	WA1 1DP	UK

INSERT INTO Example

The following SQL statement inserts a new record in the "Customers" table:

Example

```
INSERT INTO Customers (CustomerName, ContactName, Address, City, PostalCode,  
Country)  
VALUES ('Cardinal', 'Tom B. Erichsen', 'Skagen 21', 'Stavanger', '4006',  
'Norway');
```

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
1	Alfreds Futterkiste	Maria Anders	Obere Str. 57	Berlin	12209	Germany
2	Ana Trujillo Emparedados y helados	Ana Trujillo	Avda. de la Constitución 2222	México D.F.	05021	Mexico
3	Antonio Moreno Taquería	Antonio Moreno	Mataderos 2312	México D.F.	05023	Mexico
4	Around the Horn	Thomas Hardy	120 Hanover Sq.	London	WA1 1DP	UK
5	Berglunds snabbköp	Christina Berglund	Berguvsvägen 8	Luleå	S-958 22	Sweden
6	Cardinal	Tom B. Erichsen	Skagen 21	Stavanger	4006	Norway

What is a NULL Value?

A field with a NULL value is a field with no value.

If a field in a table is optional, it is possible to insert a new record or update a record without adding a value to this field. Then, the field will be saved with a NULL value.

Note: A NULL value is different from a zero value or a field that contains spaces. A field with a NULL value is one that has been left blank during record creation!

```
SELECT CustomerName, ContactName, Address FROM Customers WHERE Address IS NULL;
```

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25

행 필터링:

현재 테이블 검색

+ 옵션



CustomerName

ContactName

Address



복사



삭제

Jane

NULL

NULL

```
SELECT CustomerName, ContactName, Address FROM Customers WHERE Address IS NOT NULL;
```

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현재 테이블 검색

Sort by key:

없음

옵션



CustomerName

ContactName

Address

수정 복사 삭제 Alfreds Futterkiste

Maria Anders

Obere Str. 57

수정 복사 삭제 Ana Trujillo Emparedados y helados

Ana Trujillo

Avda. de la Constitución 2222

수정 복사 삭제 Antonio Moreno Taquería

Antonio Moreno

Mataderos 2312

수정 복사 삭제 Around the Horn

Thomas Hardy

120 Hanover Sq.

수정 복사 삭제 Berglunds snabbköp

Christina Berglund

Berguvsvägen 8

CustomerID	CustomerName	ContactName	Address	City	PostalCode
1	Alfreds Futterkiste	Maria Anders	Obere Str. 57	Berlin	12209
2	Ana Trujillo Emparedados y helados	Ana Trujillo	Avda. de la Constitución 2222	México D.F.	05021

✓ 1 열에 적용되었습니다. (질의 실행시간 0.0027 초.)

```
UPDATE Customers SET ContactName = 'Alfred Schmidt', City= 'Frankfurt' WHERE CustomerID = 1;
```

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
1	Alfreds Futterkiste	Alfred Schmidt	Obere Str. 57	Frankfurt	12209	Germany
2	Ana Trujillo Emparedados y helados	Ana Trujillo	Avda. de la Constitución 2222	México D.F.	05021	Mexico

UPDATE Multiple Records

It is the **WHERE** clause that determines how many records will be updated.

✓ 2 열에 적용되었습니다. (질의 실행시간 0.0069 초.)

```
UPDATE Customers SET ContactName='Juan' WHERE Country='Mexico';
```

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
1	Alfreds Futterkiste	Alfred Schmidt	Obere Str. 57	Frankfurt	12209	Germany
2	Ana Trujillo Emparedados y helados	Juan	Avda. de la Constitución 2222	México D.F. 05021		Mexico
3	Antonio Moreno Taquería	Juan	Mataderos 2312	México D.F. 05023		Mexico

Update Warning!

Be careful when updating records. If you omit the **WHERE** clause, ALL records will be updated!

Example

```
UPDATE Customers  
SET ContactName='Juan';
```

The SQL DELETE Statement

The `DELETE` statement is used to delete existing records in a table.

DELETE Syntax

```
DELETE FROM table_name WHERE condition;
```

Note: Be careful when deleting records in a table! Notice the `WHERE` clause in the `DELETE` statement. The `WHERE` clause specifies which record(s) should be deleted. If you omit the `WHERE` clause, all records in the table will be deleted!

✓ 1 열에 적용되었습니다. (질의 실행시간 0.0068 초.)

```
DELETE FROM Customers WHERE CustomerName='Alfreds Futterkiste';
```

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
2	Ana Trujillo Emparedados y helados	Juan	Avda. de la Constitución 2222	México D.F.	05021	Mexico
3	Antonio Moreno Taquería	Juan	Mataderos 2312	México D.F.	05023	Mexico

Delete All Records

It is possible to delete all rows in a table without deleting the table. This means that the table structure, attributes, and indexes will be intact:

```
DELETE FROM table_name;
```

The following SQL statement deletes all rows in the "Customers" table, without deleting the table:

Example

```
DELETE FROM Customers;
```

Contact Info

unitwin.lms@gmail.com

<https://ecampus.handong.edu/>



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