

BASIC SQL

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COURSE DETAIL

- Basics for SQL and Relational Database
- Working knowledge of SQL and Relational Database
- Connect to Database and run SQL queries. Assignment to apply concepts with real world Dataset:
 - Using SELECT to retrieve columns from a table
 - Sorting and filtering query results
 - Using joins and subqueries to retrieve data from multiple tables
 - Using built-in functions, aggregations, and groupings
 - Inserting, updating, and deleting data

MODULE

01

Getting started with
Transact - SQL

03

Using Subqueries and Joins

02

Relational Database

04

Data normalization

MODULE I.

GET STARTED WITH TRANSACT - SQL



MODULE I: GET STARTED WITH TRANSACT - SQL



Introduction to SQL



Using SQL Statement

Introduction to SQL

MODULE I: GET STARTED WITH TRANSACT - SQL

WHAT IS SQL?

- A language used for relational databases.
- Query data.
- Different types of SQL



WHAT IS DATA?

- Collection of **Fact** (words, numbers, pictures,...).
- One of the most **critical assets** of any business.
- Needs to be secure.

WHAT IS DATABASE?

- A repository of data.
- Provides the functionality for adding, modifying and querying that data.
- Different kinds of databases store data in different forms.

Relational Database

- Data stored in tabular form - columns and rows.
- Relationship can exist between tables(hence: “relational”).

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Relational Database

Purchase table

Transaction ID	Customer ID	Product ID	Purchase date
1112	24221	8977	03-22-2010
1113	24222	8978	03-22-2010
1114	24223	8979	03-22-2010

Customer ID	Customer	Address
24221	Bob	123 East street
24222	Alice	223 Main street
24223	Martha	465 North street

Customer table

Product ID	Name	Price
8977	Banana	.79
8978	TV	400
8979	Watch	50

Product table

Database Management System (DBMS)

- Software systems used to store, retrieve, and run queries on data.
- A DBMS serves as an interface between an end-user and a database, allowing users to create, read, update, and delete data in the database.

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Relational Database Management System (RDBMS)



RDBMS

Relational Database
Management Systems

Using SQL Statement

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SQL Statement Types

Data Manipulation Language (DML)	Data Definition Language (DDL)	Data Control Language (DCL)
<p>Statements for querying and modifying data:</p> <ul style="list-style-type: none">• SELECT• INSERT• UPDATE• DELETE	<p>Statements for defining database objects:</p> <ul style="list-style-type: none">• CREATE• ALTER• DROP	<p>Statements for assigning security permissions:</p> <ul style="list-style-type: none">• GRANT• REVOKE• DENY

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Data Types

Exact Numeric	Approximate Numeric	Charater	Date/Time	Binary
Tinyint	Float	Char	Date	Binary
Smallint	real	Varchar	Time	Varbinary
Int		Text	Datetime	Image
Bigint		Nchar		
		Nvarchar		
		Ntext		

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CREATE

CREATE DATABASE Statement: create a new SQL database.

```
CREATE DATABASE databasename;
```

CREATE TABLE Statement: create a new table in a database.

```
CREATE TABLE table_name(  
    column1 datatype,  
    column2 datatype,  
    column3 datatype,  
    ...  
);
```

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CREATE - Example

CREATE DATABASE Statement

```
CREATE DATABASE D4E;
```

CREATE TABLE Statement

```
CREATE TABLE Customer(  
    ID int,  
    Name varchar(100),  
    phoneNumber varchar(10),  
    Address varchar(100)  
)
```

ID	Name	phoneNumber	Address

INSERT INTO Statement

INSERT INTO: insert new records in a table.

Specify both the column names and the values to be inserted:

```
INSERT INTO table_name (column1, column2, column3,...)  
VALUES (value1, value2, value3,...);
```

Adding values for all the columns of the table:

```
INSERT INTO table_name  
VALUES (value1, value2, value3,...);
```

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INSERT INTO Statement - Example

```
INSERT INTO Customer (ID, Name, phoneNumber, Address)
VALUES (1, N'Nguyễn Lê Chí Bảo', '0915442420', N'Hồ Chí Minh');
```

ID	Name	phoneNumber	Address
1	Nguyễn Lê Chí Bảo	0915442420	Hồ Chí Minh
2	Trần Thị Thùy Linh	0924556999	Hà Nội
3	Trần Trung Quân	0912436767	Đà Nẵng
4			
...			

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SELECT

SELECT statement: select data from a database.

Specific columns

```
SELECT column1, column2, column3,...  
FROM table_name;
```

All columns

```
SELECT *  
FROM table_name;
```

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WHERE

WHERE statement: used to filter records (extract only those records that fulfill a specified condition).

```
SELECT column1, column2, column3,...  
FROM table_name  
WHERE condition;
```

	Element	Expression	Role
3	SELECT	<select list>	Defines which columns to return
1	FROM	<table source>	Defines table(s) to query
2	WHERE	<search condition>	Filters rows using a predicate

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WHERE - Example

Selects all the customers from the country "Mexico", in the "Customers" table:

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

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



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
13	Centro comercial Moctezuma	Francisco Chang	Sierras de Granada 9993	México D.F.	05022	Mexico
58	Pericles Comidas clásicas	Guillermo Fernández	Calle Dr. Jorge Cash 321	México D.F.	05033	Mexico
80	Tortuga Restaurante	Miguel Angel Paolino	Avda. Azteca 123	México D.F.	05033	Mexico

WHERE

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Group	Operator	Description
Arithmetic Operators	+	Addition
	-	Subtraction
	*	Multiplication
	/	Division
	%	Returns the integer remainder of a division. For example, $17 \% 5 = 2$ because the remainder of 17 divided by 5 is 2.

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WHERE

Group	Operator	Description
Comparison operators	=	Equal
	!= or <>	Not equal
	<	Greater than
	>	Less than
	>=	Greater than or equal
	<=	Less than or equal
Logical operators	AND	Return records that meet all the conditions separated by AND in WHERE clause.
	OR	Return records that meet any of the conditions separated by OR in WHERE clause.
	NOT	Return records that do not satisfy any of the conditions in WHERE clause.
SQL operators	[NOT] BETWEEN	Returns values [NOT] within a given range
	[NOT] IN	Specify multiple values in a WHERE clause (a shorthand for multiple OR conditions)
	IS [NOT] NULL	Returns records having [NOT] NULL values in the given fields.
	[NOT] LIKE	Returns records that [DO NOT] match a specified pattern in a column.

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WHERE

IN

```
SELECT column_name(s)
FROM table_name
WHERE column_name IN (value1, value2,...)
```

```
SELECT column_name(s)
FROM table_name
WHERE column_name IN (SELECT statement)
```

BETWEEN

```
SELECT column_name(s)
FROM table_name
WHERE column_name BETWEEN value1
AND value2;
```

- The BETWEEN operator selects values within a given range. The values can be numbers, text, or dates.
- The BETWEEN operator is inclusive: begin and end values are included

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WHERE

LIKE

```
SELECT column_name(s)
FROM table_name
WHERE column_name LIKE parttern
```

% : The percent sign represents zero, one, or multiple characters

_ : The underscore represents a single character

LIKE Operator	Description
WHERE CustomerName LIKE 'a%'	Finds any values that start with "a"
WHERE CustomerName LIKE '%a'	Finds any values that end with "a"
WHERE CustomerName LIKE '%or%'	Finds any values that have "or" in any position
WHERE CustomerName LIKE '_r%'	Finds any values that have "r" in the second position
WHERE CustomerName LIKE 'a_%'	Finds any values that start with "a" and are at least 2 characters in length
WHERE CustomerName LIKE 'a__%'	Finds any values that start with "a" and are at least 3 characters in length
WHERE ContactName LIKE 'a%o'	Finds any values that start with "a" and ends with "o"

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DISTINCT

SELECT DISTINCT statement: return only distinct (different) values.

```
SELECT DISTINCT column1, column2,...  
FROM table_name
```

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DISTINCT - Example

Selects only the DISTINCT values from the "Country" column in the "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
5	Berglunds snabbköp	Christina Berglund	Berguvsvägen 8	Luleå	S-958 22	Sweden

```
SELECT DISTINCT Country
FROM Customers
```

Country

Germany

Mexico

UK

Sweden

France

Spain

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TOP

TOP statement: specify the number of records to return.

```
SELECT TOP number column_name(s)  
FROM table_name  
WHERE condition;
```

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TOP - Example

Selects the first three records from the "Customers" table

```
SELECT TOP 3 *  
FROM Customers
```

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

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

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COUNT

COUNT statement: returns the number of rows that matches a specified criterion.

```
SELECT COUNT(Column_name)  
FROM table_name  
WHERE condition;
```

Number of rows in a table:

```
SELECT COUNT(*)  
FROM table_name;
```


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UPDATE

UPDATE statement: returns the number of rows that matches a specified criterion.

```
UPDATE table_name  
SET column1=value1, column2 = value2,...  
WHERE condition;
```

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UPDATE - Example

Updates the first customer (CustomerID = 1) with a new contact person and a new city.

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

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



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
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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DELETE

DELETE statement: delete existing records in a table..

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

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DELETE - Example

Deletes the customer "Alfreds Futterkiste" from the "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

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

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
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MODULE I: GET STARTED WITH TRANSACT - SQL



Introduction to SQL

- SQL, Data, Database
- DBMS, RDBMS



Using SQL Statement

- Data types
- SELECT, COUNT, DISTINCT
- INSERT, UPDATE, DELETE

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PRACTICE

Table: <https://data.sf.gov.org/Culture-and-Recreation/Film-Locations-in-San-Francisco/yitu-d5am>

Title	↑	Release Year	Locations	Fun Facts	Production Company	Distributor	Director	Writer	Actor 1	Actor 2	Actor 3
180		2011	Epic Roasthouse (399 Embarcadero)		SPI Cinemas		Jayendra	Umarji Anuradha, Jayendra...	Siddarth	Nithya Menon	Priya Anand
180		2011	Mason & California Streets (Nob H...		SPI Cinemas		Jayendra	Umarji Anuradha, Jayendra...	Siddarth	Nithya Menon	Priya Anand
180		2011	Justin Herman Plaza		SPI Cinemas		Jayendra	Umarji Anuradha, Jayendra...	Siddarth	Nithya Menon	Priya Anand
180		2011	200 block Market Street		SPI Cinemas		Jayendra	Umarji Anuradha, Jayendra...	Siddarth	Nithya Menon	Priya Anand
		2011	City Hall		SPI Cinemas		Jayendra	Umarji Anuradha, Jayendra...	Siddarth	Nithya Menon	Priya Anand
180		2011	Polk & Larkin Streets		SPI Cinemas		Jayendra	Umarji Anuradha, Jayendra...	Siddarth	Nithya Menon	Priya Anand
180		2011	Randall Museum		SPI Cinemas		Jayendra	Umarji Anuradha, Jayendra...	Siddarth	Nithya Menon	Priya Anand
180		2011	555 Market St.		SPI Cinemas		Jayendra	Umarji Anuradha, Jayendra...	Siddarth	Nithya Menon	Priya Anand
24 Hours on Craigslist		2005			Yerba Buena Productions	Zealot Pictures	Michael Ferris Gibson	N/A	Craig Newmark		
40 Days and 40 Nights		2002	The Walden House, Buena Vista P...	Established in 1867, Buena Vista P...	Miramax Films	Miramax Films	Michael Lehmann	Robert Perez	Josh Hartnett	Shaynryn Sossamon	
40 Days and 40 Nights		2002	Café Trieste (609 Vallejo)	Francis Ford Coppola allegedly wr...	Miramax Films	Miramax Films	Michael Lehmann	Robert Perez	Josh Hartnett	Shaynryn Sossamon	
48 Hours		1982			Paramount Pictures	Paramount Pictures	Walter Hill	Walter Hill	Nick Nolte	Eddie Murphy	Annette O'Toole
50 First Dates		2004	Rainforest Café (145 Jefferson Stre...		Columbia Pictures Corporation	Columbia Pictures	Peter Segal	George Wing	Adam Sandler	Drew Barrymore	
About a Boy		2014	Broderick from Fulton to McAllister		NBC Studios	National Broadcasting Company	Mark J. Kunerth	Jason Katims	David Walton	Minnie Driver	
About a Boy		2014	Crissy Field		NBC Studios	National Broadcasting Company	Mark J. Kunerth	Jason Katims	David Walton	Minnie Driver	
About a Boy		2014	Powell from Bush and Sutter		NBC Studios	National Broadcasting Company	Mark J. Kunerth	Jason Katims	David Walton	Minnie Driver	

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PRACTICE

1. Retrieve the fun facts and filming locations of all films.
2. Retrieve the names of all films released in the 20th century and before (release years before 2000 including 2000) that, along with filming locations and release years.
3. Retrieve the names, production company names, filming locations, and release years of the films which are not written by James Cameron.
4. Retrieve the number of locations of the films which are directed by Woody Allen.
5. Retrieve the number of films shot at Russian Hill.
6. Retrieve the number of rows having a release year older than 1950 from the "FilmLocations" table.

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PRACTICE

Table: Instructor

	ins_id ▼	lastname ▼	firstname ▼	city ▼	country ▼
1	1	Ahuja	Rav	Toronto	CA
2	2	Chong	Raul	Toronto	CA
3	3	Vasudevan	Hima	Chicago	US

1. Insert a new instructor record with id 4 for Sandip Saha who lives in Edmonton, CA into the "Instructor" table.
2. Insert two new instructor records into the "Instructor" table. First record with id 5 for John Doe who lives in Sydney, AU. Second record with id 6 for Jane Doe who lives in Dhaka, BD.
3. Update the city for Sandip to Toronto.
4. Update the city and country for Doe with id 5 to Dubai and AE respectively.
5. Remove the instructor record of Doe whose id is 6.

THANKS



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