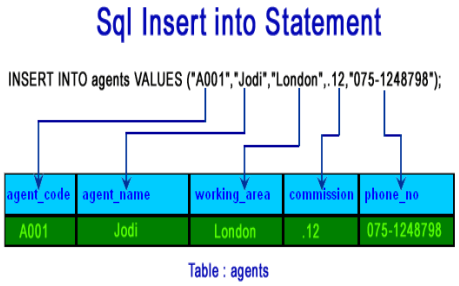
BASIC QUERIES IN SQL

Instructor:

Learning Goals

By the end of this lecture students should be able to:



- ✓ Describe each data manipulation language (DML) statement
- ✓ Insert rows into a table
- ✓ Update rows in a table
- ✓ Delete rows from a table

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- ✓ INSERT, UPDATE, DELETE Statements
- ✓ SELECT Statement
  - ✓ GROUP BY
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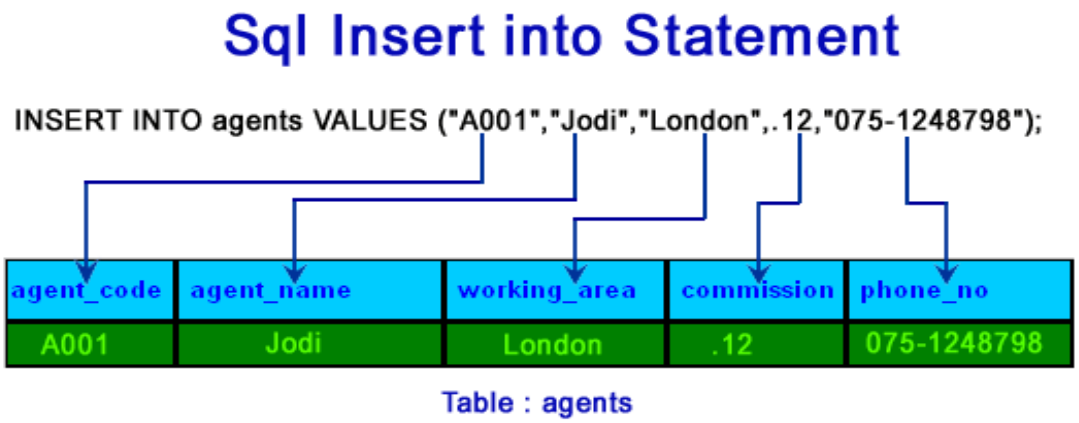
- ✓ SQL FUNCTIONS

Section 1

INSERT, UPDATE, DELETE

INSERT Statements (1/3)

- The INSERT INTO statement is used to adds one or more rows to a table or a view



INSERT Statements (2/3)

- **Syntax:**

(1) Inserting data to all columns

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

Ex1:

```
USE Fsoft_Training
INSERT INTO dbo.Persons
VALUES ( 1,'Tom', 'B. Erichsen','Skagen 21','Stavanger')
```

(2) Inserting data to selected columns

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

Ex2:

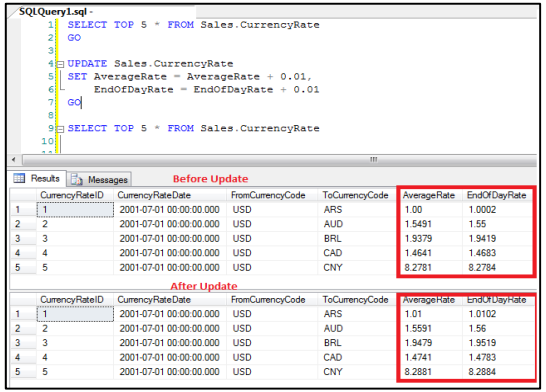
```
USE Fsoft_Training
INSERT INTO dbo.Customer (CustomerName, City, Country)
VALUES ('Cardinal', 'Stavanger', 'Norway');
```

INSERT in practice

- **Always check data in various cases:**
  - ✓ Normal/Abnormal
  - ✓ Invalid data type
  - ✓ Special characters: ~!@#$%^&*()_
  - ✓ Special string characters: ‘ char(10) char(13) tab space
  - ✓ Max length, Max/Min value
  - ✓ Duplicated value in UNIQUE constraints

UPDATE Statement (1/2)

- The UPDATE statement is used to changes existing data in a table or view



- **Best Practice**
  - ✓ Use the @@**ROWCOUNT** function to return the number of inserted rows to the client application.

UPDATE Statement (2/2)

- **Syntax:**

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

Notice the WHERE clause in the SQL UPDATE statement!

The WHERE clause specifies which record or records that should be updated. If you omit the WHERE clause, all records will be updated!

- Ex:

```
USE Fsoft_Training
UPDATE dbo.Customer
SET PostalCode = '4006'
WHERE Country = 'Norway'
SELECT @@ROWCOUNT AS ROW_COUNT
```

Results | Messages

	ROW_COUNT
1	2

DELETE Statement (1/2)

- Removes one or more rows from a table or view

CustomerId	CustomerName	ContactName
1	Alfreds Futterkiste	Maria Anders
~~2~~	~~Around the Horn~~	~~Thomas Hardy~~
3	Berglunds snabbköp	Christina Berglund
4	Antonio Moreno	Antonio Moreno
~~5~~	~~Ana Trujillo~~	~~Ana Trujillo~~

- **Best Practice:**

  To delete all the rows in a table, use TRUNCATE TABLE. TRUNCATE TABLE is faster than DELETE and uses fewer system and transaction log resources.

  TRUNCATE TABLE has restrictions, for example, the table cannot participate in replication

DELETE Statement (2/2)

- **Syntax:**

```
DELETE FROM table_name
WHERE some_column=some_value;
```

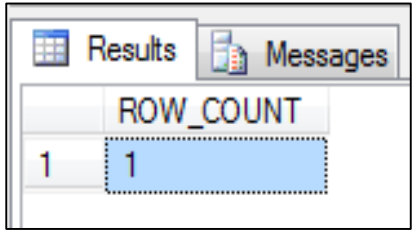
- **Notice the WHERE clause in the SQL DELETE statement!**

The WHERE clause specifies which record or records that should be deleted. If you omit the WHERE clause, all records will be deleted!

Please note that the DELETE FROM command cannot delete any rows of data that would violate FOREIGN KEY or other constraints.

- **Ex:**

```
USE Fsoft_Training
DELETE dbo.Customer
WHERE Country = 'Germany'
SELECT @@ROWCOUNT AS ROW_COUNT
```



Section 2

SELECT STATEMENT

SELECT Statement (1/4)

- Retrieves rows from the database and enables the selection of one or many rows or columns from one or many tables

SELECT Statement (2/4)

- **Syntax**:

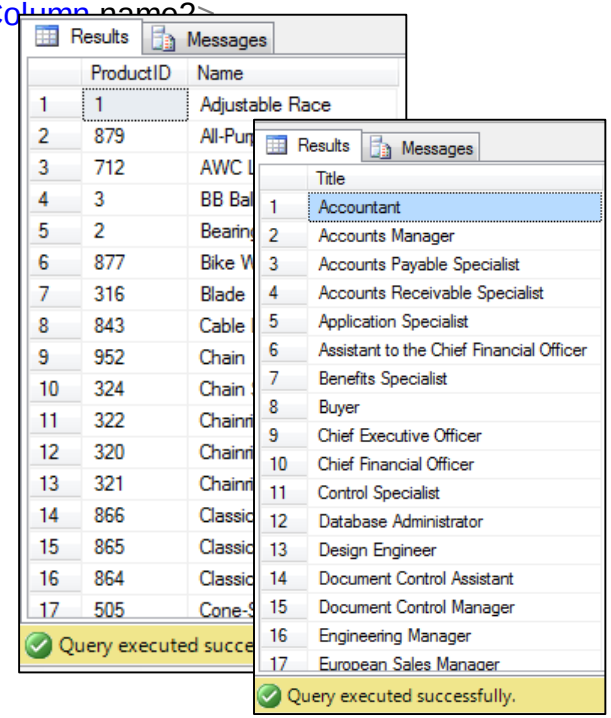
```
SELECT [ALL/DISTINCT/TOP [ WITH TIES ] ] <Column name1>, <Column name2>
        FROM <Table name>
        [WHERE <Search condition>]
        [GROUP BY grouping columns]
        [HAVING search condition]
        [ORDER BY sort specification]
```

Ex1:

```
USE AdventureWorks
GO
SELECT ProductID, Name
FROM Production.Product
ORDER BY Name ASC;
(504 rows)
```

Ex2:

```
SELECT DISTINCT E.Title
FROM HumanResources.Employee E
ORDER BY E.Title;
(67 rows)
```



SELECT Statement (4/4)

- **SQL Alias syntax:**
  - ✓ *For table*

```
SELECT column_name(s)
FROM table_name AS alias_name
```

  - ✓ *For Column(s)*

```
SELECT column_name AS alias_name
FROM table_name
```

- **Ex:**

```
USE AdventureWorks
GO
SELECT c.CustomerID, s.Name
FROM Sales.Customer AS c
        JOIN Sales.Store AS s
                ON c.CustomerID = s.SalesPersonID
```

Grouping by clause

- Sometimes we want to apply aggregate functions to groups of rows.

Syntax:

```
SELECT column_name, aggregate_function(column_name)
FROM table_name
WHERE column_name operator value
GROUP BY column_name;
```

- Example, find the average mark of each student.

Group

Id	Name	SubjectID	Mark
1	John	DBS	76
2	John	IAI	72
3	Mary	DBS	60
4	Mand	PR1	63
5	Mand	PR2	35
6	Jane	IAI	54

Grades

```
SELECT Name,
AVG(Mark) AS Average
FROM Grades
GROUP BY Name
```

Name	Average
John	74
Mary	60
Mand	49
Jane	54

Having clause

- **HAVING** is like a **WHERE** clause, except that it applies to the results of a **GROUP BY** query.
- It can be used to select groups which satisfy a given condition.
- **Ex**:

```
SELECT Name, AVG(Mark) AS Average
FROM Grades
GROUP BY Name
HAVING AVG(Mark) >= 50
```

Id	Name	SubjectID	Mark
1	John	DBS	76
2	John	IAI	72
3	Mary	DBS	60
4	Mand	PR1	63
5	Mand	PR2	35
6	Jane	IAI	54

Name	Average
John	74
Mary	60
Jane	54

WHERE and HAVING

- **WHERE** refers to the rows of tables, and so cannot use aggregate functions
- **HAVING** refers to the groups of rows, can use aggregate functions and cannot use columns which are not in the `GROUP BY`

```
SELECT Name,
AVG(Mark) AS Average
FROM Grades
WHERE AVG(Mark) >= 50
GROUP BY Name
```

```
SELECT Name,
AVG(Mark) AS Average
FROM Grades
GROUP BY Name
HAVING AVG(Mark) >= 50
```

Order by clause

- The SQL **ORDER BY clause** is used to sort (ascending or descending) the records in the result set for a SELECT statement.

Syntax:

```
SELECT column_name, column_name
FROM table_name
[WHERE  conditions]
ORDER BY column_name, column_name [ASC|DESC]
```

- **Ex:**

Group

Id	Name	SubjectID	Mark
1	John	DBS	76
2	John	IAI	72
3	Mary	DBS	60
4	Mand	PR1	63
5	Mand	PR2	35
6	Jane	IAI	54

```
SELECT Name,
AVG(Mark) AS Average
FROM Grades
GROUP BY Name
ORDER BY Average DESC
```

Grades

Name	Average
John	74
Mary	60
Jane	54
Mand	49

Section 3

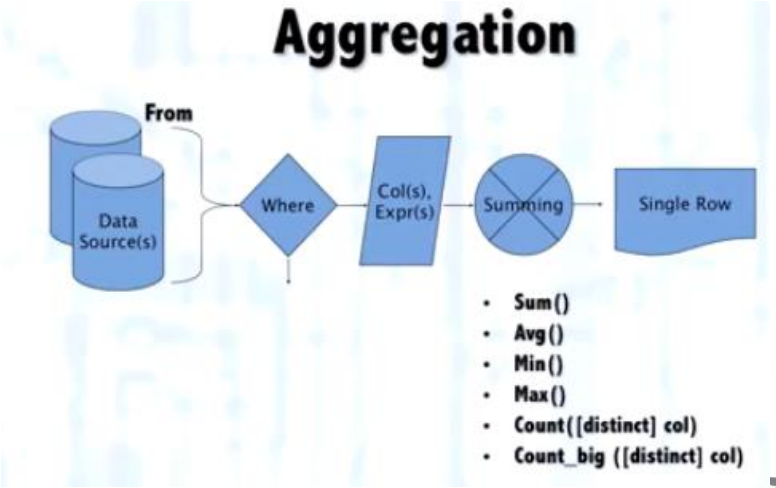
SQL FUNCTIONS

SQL Functions

- SQL has many built-in functions for performing calculations on data:
  - ✓ SQL aggregate functions return a single value, calculated from values in a column.
  - ✓ SQL scalar functions return a single value, based on the input value.

What is an aggregate function

- An aggregate function is function that take a collection of values as input and return a single value.
- Aggregate functions can be used as expressions only in the following:
  - ✓ The select list of a SELECT statement
  - ✓ A HAVING clause.



Aggregate Functions

- Each function eliminates NULL values and operates on Non-NULL values

Function	Description
AVG ()	Return the average value in a column
COUNT()	Return the total number of values in a given column
COUNT(*)	Return the number of rows
MIN ()	Returns the smallest value in a column
MAX ()	Returns the largest value in a column
SUM()	Returns the sum values in a column

Scalar functions

Function	Description
LEN()	Returns the length of a text field
ROUND()	Rounds a numeric field to the number of decimals specified
NOW()	Returns the current system date and time
FORMAT()	Formats how a field is to be displayed

UNION Operator

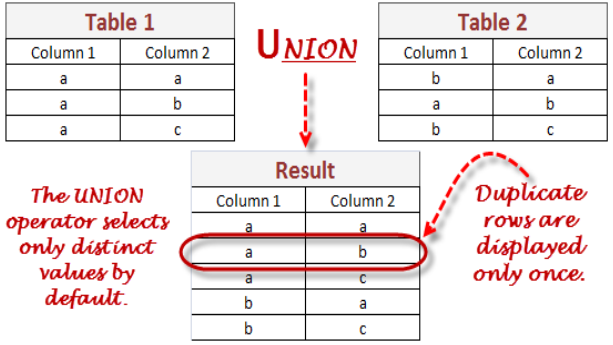
- The SQL UNION operator combines the result of two or more SELECT statements.

Syntax:

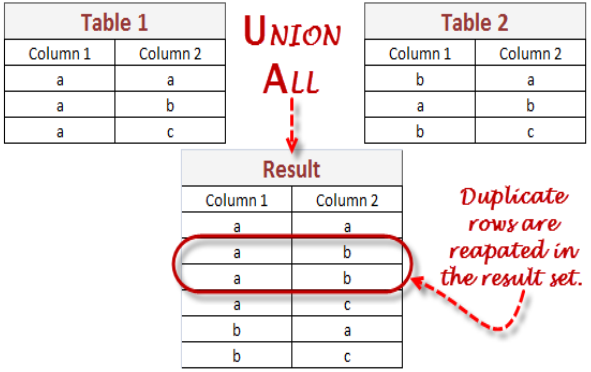
```
SELECT column_name(s) FROM table1
UNION
SELECT column_name(s) FROM table2;
```

Note: The UNION operator selects only distinct values by default. To allow duplicate values, use the ALL keyword with UNION.

```
SELECT Column1, Column2 FROM Table1
UNION
SELECT Column1, Column2 FROM
Table2;
```




```
SELECT Column1, Column2 FROM Table1
UNION ALL
SELECT Column1, Column2 FROM
Table2;
```



Summary

- ✓ INSERT, UPDATE, DELETE Statements
- ✓ SELECT Statement
  - ✓ GROUP BY
  - ✓ HAVING
  - ✓ ORDER BY
- ✓ SQL FUNCTIONS

Thank you