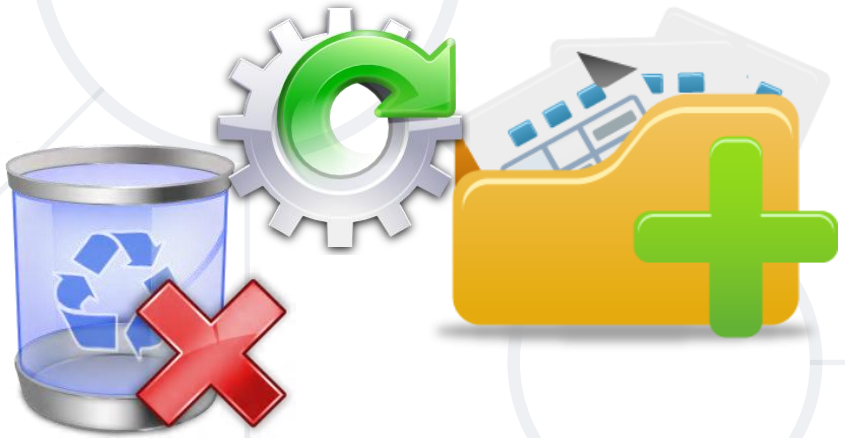
Basic CRUD in SQL Server

Create, Read, Update, Delete

using SQL Queries



SoftUni Team

Technical Trainers

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Query Basics

SQL and T-SQL Introduction

What Are SQL and T-SQL?

- **Structured Query Language**
  - Declarative language
  - Close to regular English

```
SELECT FirstName, LastName, JobTitle FROM Employees
```

  - Supports definition, manipulation and access control of records
- **Transact-SQL (T-SQL)** – SQL Server's version of SQL
  - Supports control flow (**if**-statements, **loops**)
  - Designed for writing **logic** inside the database

SQL – Examples

```
SELECT FirstName, LastName, JobTitle FROM Employees
```

```
SELECT * FROM Projects WHERE StartDate = '1/1/2006'
```

```
INSERT INTO Projects(Name, StartDate)
     VALUES ('Introduction to SQL Course', '1/1/2006')
```

```
UPDATE Projects
   SET EndDate = '8/31/2006'
 WHERE StartDate = '1/1/2006'
```

```
DELETE FROM Projects
      WHERE StartDate = '1/1/2006'
```

Retrieving Data

Using SQL SELECT

Capabilities of SQL SELECT

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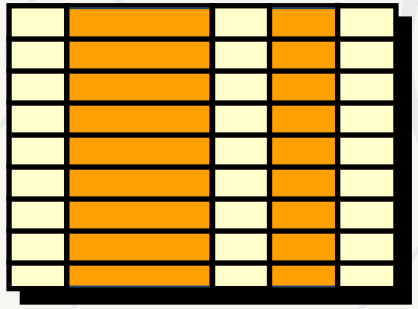
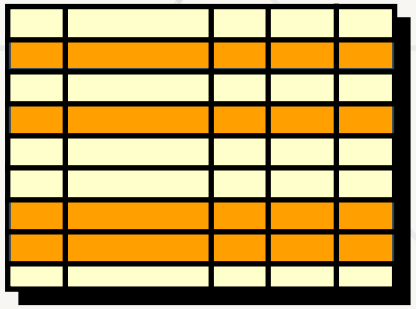
Projection

Take a subset of the columns



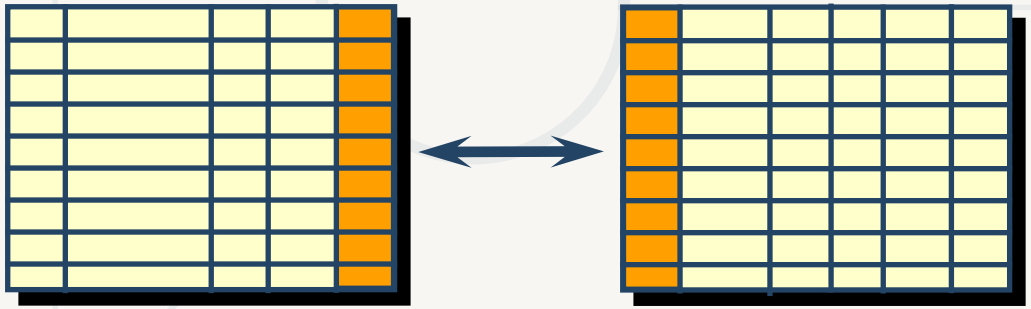
Selection

Take a subset of the rows



Join

Combine tables by some column



SELECT – Example

- Selecting **all** columns from the "Departments" table

```
SELECT * FROM Departments
```

DepartmentID	Name	ManagerID
1	Engineering	12
2	Tool design	4
3	Sales	273
…	…	…

- Selecting **specific** columns

```
SELECT DepartmentId, Name
  FROM Departments
```

DepartmentID	Name
1	Engineering
2	Tool design
3	Sales
…	…

Column Aliases

- **Aliases** rename a table or a column heading

Display Name

```
SELECT EmployeeID AS ID,
       FirstName,
       LastName
  FROM Employees
```

ID	FirstName	LastName
1	Guy	Gilbert
2	Kevin	Brown
…	…	…

- You can shorten fields or clarify abbreviations

```
SELECT c.Duration,
       c.ACG AS 'Access Control Gateway'
FROM Calls AS c
```

Concatenation Operator

- You can **concatenate** column names using the **+** operator
  - **String literals** are enclosed in **single quotes**
  - Column names containing **special symbols** use **brackets**

```
SELECT FirstName + ' ' + LastName AS [Full Name],
       EmployeeID AS [No.]
  FROM Employees
```

Full Name	No.
Guy Gilbert	1
Kevin Brown	2
…	…

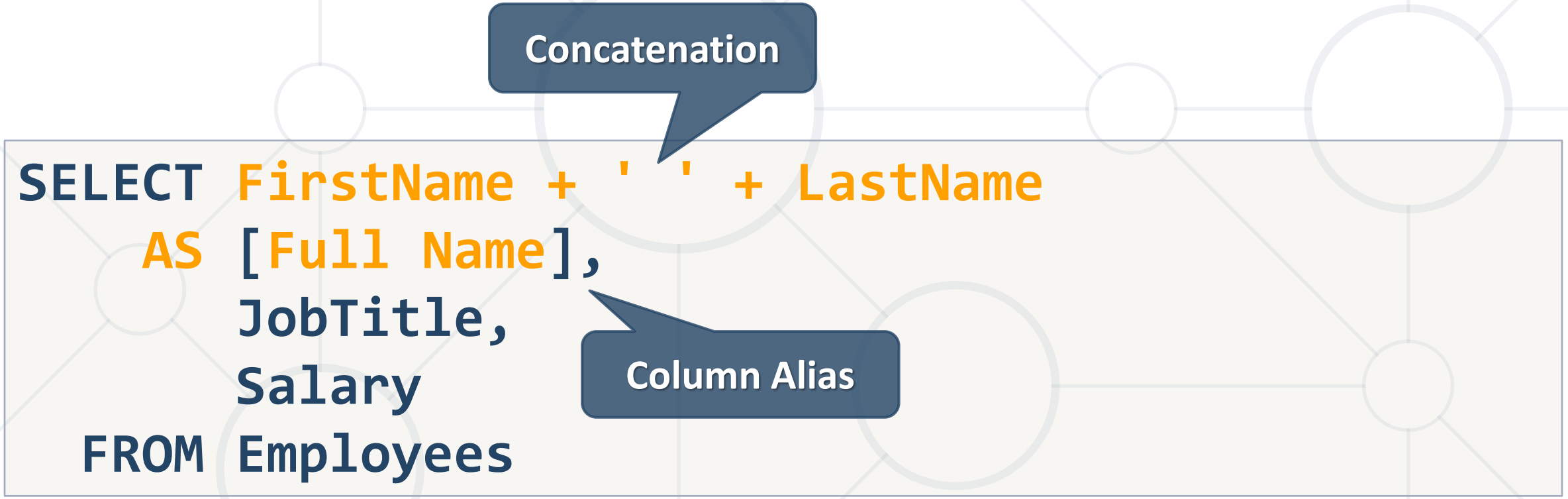
Problem: Employee Summary

- Find information about all employees, listing their **full name**, **job title** and **salary**
  - Use **concatenation** to display first and last names as **one field**

	Full Name	JobTitle	Salary
1	Guy Gilbert	Production Technician	12500.00
2	Kevin Brown	Marketing Assistant	13500.00
3	Roberto Tamburello	Engineering Manager	43300.00
4	Rob Walters	Senior Tool Designer	29800.00
5	Thierry D'Hers	Tool Designer	25000.00
6	David Bradley	Marketing Manager	37500.00
7	JoLynn Dobney	Production Supervisor	25000.00
8	Ruth Ellerbrock	Production Technician	13500.00
9	Gail Erickson	Design Engineer	32700.00

  - Note: Query `SoftUni` database

Solution: Employee Summary



Filtering the Selected Rows

- Use **DISTINCT** to eliminate **duplicate** results

```
SELECT DISTINCT DepartmentID
  FROM Employees
```

- Filter rows by specific **conditions** using the **WHERE** clause

```
SELECT LastName, DepartmentID
  FROM Employees
 WHERE DepartmentID = 1
```

- Other **logical operators** can be used for greater control

```
SELECT LastName, Salary FROM Employees
 WHERE Salary <= 20000
```

Other Comparison Conditions

- Combine conditions using **NOT**, **OR**, **AND** and **brackets**

```
SELECT LastName FROM Employees
WHERE NOT (ManagerID = 3 OR ManagerID = 4)
```

- Using **BETWEEN** operator to **specify a range**

```
SELECT LastName, Salary FROM Employees
 WHERE Salary BETWEEN 20000 AND 22000
```

- Using **IN / NOT IN** to specify **a set of values**

```
SELECT FirstName, LastName, ManagerID
  FROM Employees
 WHERE ManagerID IN (109, 3, 16)
```

Comparing with NULL

- **NULL** is a special value that means missing value
  - Not the same as **0** or a **blank space**
- Checking for **NULL** values

```
SELECT LastName, ManagerId FROM Employees
 WHERE ManagerId = NULL
```

This is always **false**!

```
SELECT LastName, ManagerId FROM Employees
 WHERE ManagerId IS NULL
```

```
SELECT LastName, ManagerId FROM Employees
 WHERE ManagerId IS NOT NULL
```

Sorting Result Sets

- Sort rows with the **ORDER BY** clause
  - **ASC**: ascending order, default
  - **DESC**: descending order

```
  SELECT LastName, HireDate
    FROM Employees
ORDER BY HireDate
```

```
  SELECT LastName, HireDate
    FROM Employees
ORDER BY HireDate DESC
```

LastName	HireDate
Gilbert	1998-07-31
Brown	1999-02-26
Tamburello	1999-12-12
…	…

LastName	HireDate
Valdez	2005-07-01
Tsoflias	2005-07-01
Abbas	2005-04-15
…	…

Views

- Views are **named** (**saved**) **queries**
  - **Simplify** complex queries
  - **Limit access** to data for certain users

- Example: Get employee **names** and **salaries**, by department

```
CREATE VIEW v_EmployeesByDepartment AS
SELECT FirstName + ' ' + LastName AS [Full Name],
       Salary
  FROM Employees
```

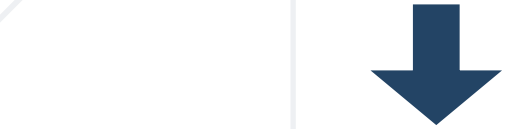
```
SELECT * FROM v_EmployeesByDepartment
```

Executes query

Problem: Highest Peak

- Create a **view** that selects all information about the **highest peak**
  - Name the view **v_HighestPeak**

```
SELECT * FROM v_HighestPeak
```



	Id	PeakName	Elevation	MountainId
1	68	Everest	8848	9

  - Note: Query **Geography** database

Solution: Highest Peak

- `TOP(x)` selects the first x values

```
CREATE VIEW v_HighestPeak
         AS
     SELECT TOP (1) *
       FROM Peaks
   ORDER BY Elevation DESC
```

Sorting column

Greatest value first

Writing Data in Tables

Using SQL INSERT

Inserting Data

- The SQL **INSERT** command

```
INSERT INTO Towns VALUES (33, 'Paris')
```

```
INSERT INTO Projects (Name, StartDate)
     VALUES ('Reflective Jacket', GETDATE())
```

- **Bulk data** can be recorded in a single query, separated by comma

```
INSERT INTO EmployeesProjects
     VALUES (229, 1),
            (229, 2),
            (229, 3), …
```

Inserting Data (2)

- Inserting rows into existing table:

List of columns

```
INSERT INTO Projects (Name, StartDate)
     SELECT Name + ' Restructuring', GETDATE()
       FROM Departments
```

- Using existing records to create a **new table**:

```
SELECT CustomerID, FirstName, Email, Phone
  INTO CustomerContacts
  FROM Customers
```

New table name

Existing source

Sequences

- **Sequences** are **special object** in SQL Server
  - Similar to **IDENTITY** fields
- Returns an **incrementing value** every time it's used

```
CREATE SEQUENCE seq_Customers_CustomerID
                AS INT
      START WITH 1
    INCREMENT BY 1
```

```
SELECT NEXT VALUE FOR seq_Customers_CustomerID
```

Modifying Existing Records

Using SQL UPDATE and DELETE

Deleting Data

- Deleting specific rows from a table

```
DELETE FROM Employees WHERE EmployeeID = 1
```

Condition

- Note: Don't forget the **WHERE** clause!

- Delete all rows from a table (works faster than **DELETE**):

```
TRUNCATE TABLE Users
```

Updating Data

- The SQL **UPDATE** command

```
UPDATE Employees
   SET LastName = 'Brown'
 WHERE EmployeeID = 1
```

New values

```
UPDATE Employees
   SET Salary = Salary * 1.10,
       JobTitle = 'Senior' + JobTitle
 WHERE DepartmentID = 3
```

- Note: Don't forget the **WHERE** clause!

Problem: Update Projects

- Mark **all unfinished** Projects as being **completed today**
  - Hint: Unfinished projects have their **`EndDate`** set to **NULL**

Name	EndDate
Classic Vest	NULL
HL Touring Frame	NULL
LL Touring Frame	NULL
…	…

Name	EndDate
Classic Vest	2017-01-23
HL Touring Frame	2017-01-23
LL Touring Frame	2017-01-23
…	…

- Note: Query **`SoftUni`** database

Solution: Update Projects

```
UPDATE Projects
   SET EndDate = GETDATE()
 WHERE EndDate IS NULL
```

Filter only records with no value

Summary

- **T-SQL** is the language of **SQL Server**

```
SELECT *
  FROM Projects
 WHERE StartDate = '1/1/2006'
```

- Queries provide a **flexible** and **powerful method** to **manipulate records**
- **Views** allow us to **store queries** for easier use

Questions?

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