شركة تحالف الإمارات للحلول التقنية ذ.م.م.
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Database Design and Programming

Tahaluf Training Center 2021

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Day 8

1. **SQL Case**
2. SQL Functions Vs Stored Procedures
3. MS SQL Normalization

What is CASE in SQL?

- **CASE statement** (more commonly known as the CASE Expression) has the functionality of an IF-THEN-ELSE statement.
- **Unlike IF…ELSE**, where only the maximum of one condition is allowed, **CASE allows the user to apply multiple conditions** to perform different sets of actions in MS SQL.

SQL Case

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- CASE Statements can be used in **SELECT, UPDATE, DELETE, WHERE, HAVING.**
- **ELSE** is **optional** in the **CASE** statement.
- You can make any conditional **statement** using any conditional operator (like WHERE) between **WHEN** and THEN .

SQL Case


```
CASE
    WHEN condition1 THEN result1
    WHEN condition2 THEN result2
    WHEN conditionN THEN resultN
    ELSE result
END;
```

How SQL case works ?

1. The CASE statement goes through conditions and returns a value when the first condition is met.
2. So, once a condition is true, it will stop reading and return the result.
3. If no conditions are true, it returns the value in the ELSE clause.

SQL Case

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In MS SQL, there are two types of CASE:

1. Simple CASE.
2. Searched CASE.

SQL Case

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1- Simple CASE

```
CASE <Case_Expression>
    WHEN Value_1 THEN Statement_1
    WHEN Value_2 THEN Statement_2
    .
    .
    WHEN Value_N THEN Statement_N
    [ ELSE Statement_Else ]
END AS [ ALIAS_NAME ]
```

SQL Case

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2- Searched CASE

```
CASE
        WHEN <Boolean_Expression_1> THEN Statement_1
        WHEN <Boolean_Expression_2> THEN Statement_2
        .
        .
        WHEN <Boolean_Expression_N> THEN Statement_N
        [ ELSE Statement_Else ]
END AS [ ALIAS_NAME ]
```

SQL Case

- If **no *value/condition*** is found to be TRUE, then the CASE statement will return the **value in the ELSE clause.**

- If the **ELSE clause is omitted** and **no *condition* is found to be true**, then the CASE statement will return **NULL**.

- Conditions **are evaluated in the order listed**. Once a *condition* is found to be true, the CASE statement will return the result and not evaluate the conditions any further.

SQL Case

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```
SELECT * FROM HumanResources.Employee;
SELECT * FROM Person.Person;

- - Simple Case Example
SELECT p.FirstName,
      p.LastName,
CASE e.Gender
       WHEN 'F' THEN 'Female'
        WHEN 'M' THEN 'Male'
        ELSE 'Unknown‘
END AS GenderDescription
FROM HumanResources.Employee AS e
    JOIN Person.Person AS p ON e.BusinessEntityID = p.BusinessEntityID;
GO
```

SQL Case

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```
SELECT * FROM HumanResources.Employee;
SELECT * FROM Person.Person;

- - Simple Case Example
SELECT p.FirstName,
      p.LastName,
CASE MaritalStatus
       WHEN 'S' THEN 'Single'
        WHEN 'M' THEN 'Married'
        ELSE 'Unknown‘
END AS MaritalStatusDescription
FROM HumanResources.Employee AS e
    JOIN Person.Person AS p ON e.BusinessEntityID = p.BusinessEntityID;
GO
```

SQL Case


```
SELECT * FROM Production.Product;

- - Searched Case Example
SELECT ProductNumber,
      Name,
      "Price Range" = CASE
                        WHEN ListPrice = 0 THEN 'Not for resale'
                        WHEN ListPrice < 100 THEN 'Under $100'
                        WHEN ListPrice >= 100 AND ListPrice < 500 THEN 'Under $500'
                        WHEN ListPrice >= 500 AND ListPrice < 1000 THEN 'Under $1000'
                        ELSE 'Over $1000'
                      END
FROM Production.Product;
```

Day 8

1. SQL Case
2. **SQL Functions Vs Stored Procedures**
3. MS SQL Normalization

SQL NULL FUNCTION

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ISNULL()

In SQL Server (Transact-SQL), the **ISNULL function** lets you return an alternative value when an expression is NULL.

```
ISNULL ( check_expression ,
replacement_value )
```

```
SELECT Description, DiscountPct, MinQty, ISNULL(MaxQty, 0.00)
AS 'Max Quantity'
FROM Sales.SpecialOffer;
```

SQL STORED PROCEDURES

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A set of SQL statements that can be executed on the database.

```
CREATE PROC What_DB_is_this
AS
SELECT DB_NAME() AS ThisDB;
```

```
EXECUTE What_DB_is_this;
```

```
CREATE PROC What_DB
AS
SELECT DB_NAME() AS ThisDB;
```

```
EXEC What_DB;
```

Functions VS Stored Procedures

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- **SQL Server has several ways to store queries for later executions.**
- **Both** stored procedures and functions are **database objects** which contain a set of SQL statements to complete a task.
- **Stored Procedures** are **pre-compiled objects** which are compiled for the first time and its compiled format is saved, which executes (compiled code) whenever it is called.
- **A function** is **compiled and executed every time** whenever it is called. A function must return a value.

Functions Vs Stored Procedures

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Functions	Stored Procedures
Function must return a value.	The stored procedure may or not return values.
Will allow only Select statement, it will not allow us to use DML statements.	Can have select statements as well as DML statements such as insert, update, delete, etc.
It will allow only input parameters, doesn't support output parameters.	It can have both input and output parameters.
Functions can be called from select statement.	Execute/Exec statement can be used to call/execute stored procedure.

Day 8

1. SQL Case
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3. **MS SQL Normalization**

MS SQL Normalization

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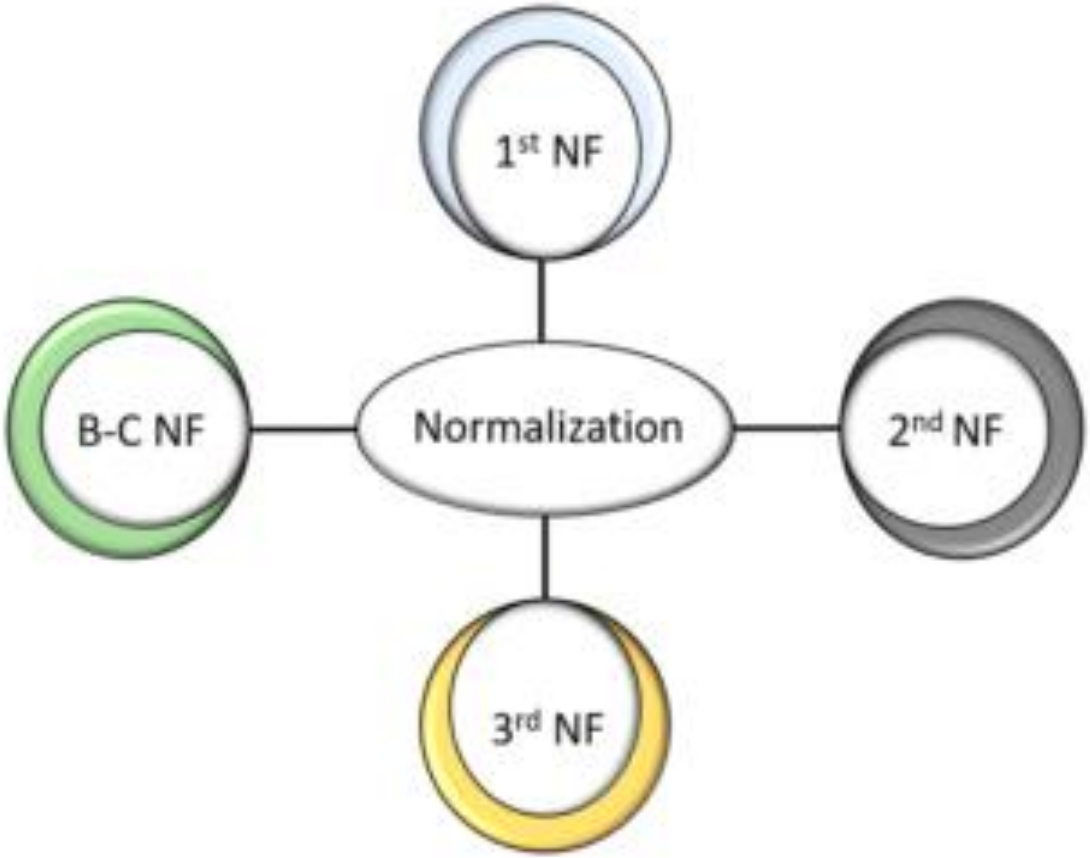
What is Normalization in a Database?

- It is **the process of reducing the redundancy of data in the table** and also **improving the data integrity.**
- **Normalization rules** divide large tables into smaller tables and link them using relationships.
- The purpose of Normalization in SQL is to **eliminate redundant (repetitive) data** and ensure data is stored logically.

MS SQL Normalization



MS SQL Normalization

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First Normal Form (1NF)

- Eliminate repeating groups in individual tables.
- Create a separate table for each set of related data.
- Identify each set of related data with a primary key.

Course	Content
Programming	Java, c++
Web	HTML, PHP, ASP

1NF

Course	Content
Programming	Java
Programming	c++
Web	HTML
Web	PHP
Web	ASP

First Normal Form (1NF)

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Student Table

roll_no	name	subject
101	Akon	OS, CN
103	Ckon	Java
102	Bkon	C, C++

As per the 1st Normal form, each column must contain an atomic value.

How to solve this Problem?

First Normal Form (1NF)

Student Table

roll_no	name	subject
101	Akon	OS
101	Akon	CN
103	Ckon	Java
102	Bkon	C
102	Bkon	C++

MS SQL Normalization

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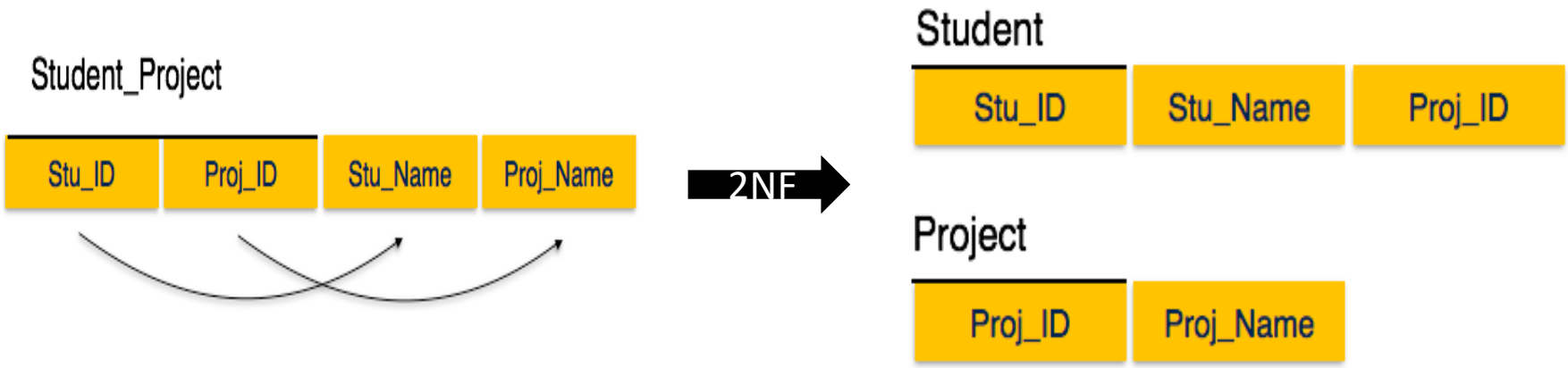
Second Normal Form (2NF)

- Create separate tables for sets of values that apply to multiple records.
- Relate these tables with a foreign key.
- There should be no Partial Dependency.



Second Normal Form (2NF)

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Student Table

student_id	name	reg_no	branch	address
10	Akon	07-WY	CSE	Kerala
11	Akon	08-WY	IT	Gujarat

Subject Table

subject_id	subject_name
1	Java
2	C++
3	Php

Score Table

score_id	student_id	subject_id	marks	teacher
1	10	1	70	Java Teacher
2	10	2	75	C++ Teacher
3	11	1	80	Java Teacher

Second Normal Form (2NF)

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Subject Table

subject_id	subject_name	teacher
1	Java	Java Teacher
2	C++	C++ Teacher
3	Php	Php Teacher

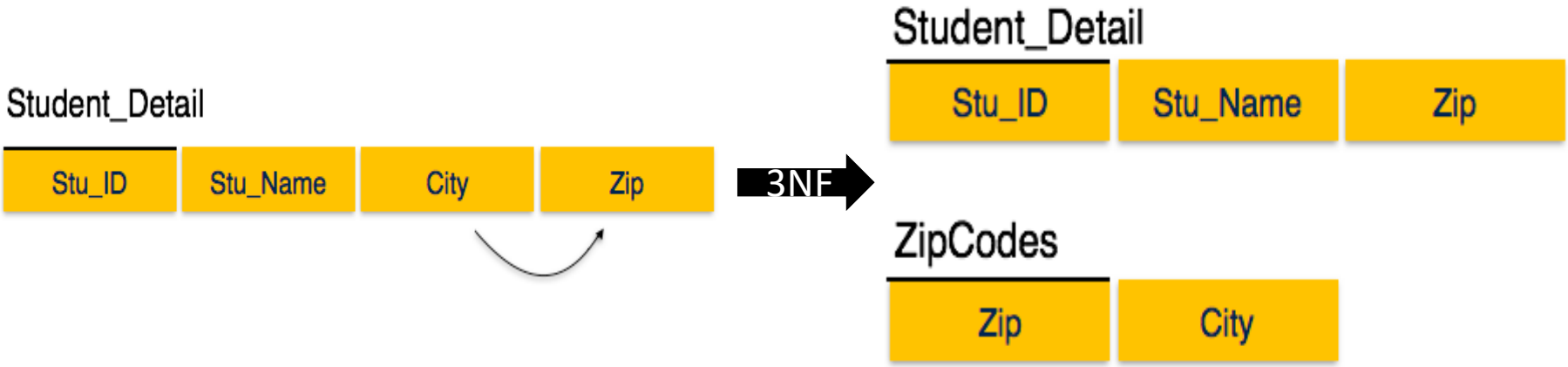
Score Table

score_id	student_id	subject_id	marks
1	10	1	70
2	10	2	75
3	11	1	80

MS SQL Normalization

Third Normal Form (3NF)

- Eliminate fields that do not depend on the key.
- It should not have Transitive Dependency.



Third Normal Form (3NF)

Student Table

student_id	name	reg_no	branch	address
10	Akon	07-WY	CSE	Kerala
11	Akon	08-WY	IT	Gujarat
12	Bkon	09-WY	IT	Rajasthan

Subject Table

subject_id	subject_name	teacher
1	Java	Java Teacher
2	C++	C++ Teacher
3	Php	Php Teacher

Third Normal Form (3NF)

Score Table

score_id	student_id	subject_id	marks
1	10	1	70
2	10	2	75
3	11	1	80

score_id	student_id	subject_id	marks	exam_name	total_marks

Third Normal Form (3NF)

Score Table: In 3rd Normal Form

score_id	student_id	subject_id	marks	exam_id

The new Exam table

exam_id	exam_name	total_marks
1	Workshop	200
2	Mains	70
3	Practicals	30

Day Eight Task

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