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**Course:** Foundations of Databases & SQL Programming

**GitHub link:** <https://github.com/i-zuzu/DBFoundations-Module07>

## Assignment 07 – Functions

### Introduction

In this document we'll cover the following topics:

1. *Explain when you would use a SQL UDF.*
2. *Explain the differences between Scalar, Inline, and Multi-Statement Functions.*

We'll start with the first item and discuss the situations when you would use a SQL UDF, User Defined Function

#### 1. Explain when you would use a SQL UDF.

User-defined functions (UDFs) in SQL can be used to improve code readability, maintainability, and reusability. UDFs are especially useful when there is some complex logic or calculation required that needs to be executed repeatedly on large datasets and that can be saved in the database for future use. UDFs can also be used to simplify work with the databases for the end-users so that an application remains secure while still allowing them to interact with the underlying data layer.

UDFs allow you to capture complex formula or business logic and reuse them in every query.

There are two basic types of functions; functions that return a table of values and functions that return a single value.

Below is the syntax used to create the UDF:

```
CREATE FUNCTION [database_name.]function_name (parameters)
RETURNS data_type AS
BEGIN
    SQL statements
    RETURN value
END;
```

#### 2. Explain the differences between Scalar, Inline, and Multi-Statement Functions.

**Scalar functions** are single-line expressions that take the input parameters, perform a single operation, and return a single value as output. Examples of scalar functions include mathematical and string manipulation operations such as AVG, Max, DATEADD, MONTH.

Example of the Scalar Function:

```
Create Function dbo.MultiplyValues(@Value1 Float, @Value2 Float)
Returns Float
As
```

```

Begin
Return(Select @Value1 * @Value2);
End
go
-- Calling the function
Select Tempdb.dbo.MultiplyValues(4, 5);
go

```

**Inline Table-Valued Function** return a table data type and also it can accept parameters. An inline function can only contain a *single* SELECT statement, and the columns in the SELECT statement implicitly define the columns of the returned table set of the function.

Example of Inline Table-Valued Function:

```

CREATE FUNCTION Sales.fn_OrderDetails_IF(@SalesOrderID int)
RETURNS TABLE
AS

RETURN(
    SELECT ROW_NUMBER() OVER (
        PARTITION BY detail.SalesOrderID
        ORDER BY SalesOrderDetailID) AS OrderRow,
        detail.OrderQty, detail.UnitPrice, detail.LineTotal,
        prod.[Name] AS ProductName, prod.Color,
        prod.StandardCost, prod.[Weight]
    FROM Sales.SalesOrderDetail AS detail
    INNER JOIN Production.Product AS prod ON
        detail.ProductID=prod.ProductID
    WHERE detail.SalesOrderID=@SalesOrderID
);

GO

```

**The Multi-Statement Table Valued Function** is a table-valued function that returns the result of multiple statements. It is almost the same as the Inline Table-Valued Function as it is also going to returns a table as an output but they can contain more than one statement, and the structure of the table returned from the structure is defined by us.

They take input parameters, carry out multiple operations, and can have output parameters. These functions can also be used to return a table or a scalar value.

Example of a Multi-Statement Table Valued Function:

```

CREATE FUNCTION MultiStatement_TableValued_Function_Name
(
    @param1 DataType,
    @param2 DataType,
    @paramN DataType
)
RETURNS
@OutputTable TABLE
(
    @Column1 DataTypeForColumn1 ,
    @Column2 DataTypeForColumn2
)
AS

```

```
BEGIN
  --FunctionBody
RETURN
END
```

## Summary

In this document we discussed when to use the User Defined Functions. Then we looked at the differences and examples of Scalar, Inline, and Multi-Statement Functions.

## Sources:

1. UW Foundations of Databases & SQL Programming, Moule07 Notes
2. OpenAI ChatGPT, Mar. 2023, chat.openai.com/chat: Aspects of this assignment were generated by ChatGPT as a starting point.
3. Inline and multi-statement table-valued functions, <https://www.wiseowl.co.uk/blog/s347/inline.htm>
4. SQL Server multi-statement table-valued functions Sep 11, 2019 by Esat Erkek, <https://www.sqlshack.com/sql-server-multi-statement-table-valued-functions/>
- 5.