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Course: IT FDN 130 A – Autumn 2022 – Foundations of Databases & SQL Programming

Assignment: Assignment 07

GitHubURL: <https://github.com/annspiral/DBFoundations-Module07>

SQL Functions

Introduction

Assignment 07 covered the use of SQL Functions. Like SQL Views, SQL Functions are a way to store SQL code in a database. While similar, functions also differ from views in that they have a slightly different syntax, they can take parameter(s), they can include multiple statements and are not always accessible from outside applications. In this assignment we covered both system defined functions and user defined functions as well as some of the different types of return results supported with functions.

SQL User Defined Functions (UDFs)

User Defined Functions are custom functions that can be saved in the database. Examples of when you might use a UDF include:

- When the result set of a view is regularly filtered by a different value or values ([Table-valued functions in SQL \(wiseowl.co.uk\)](#), WiseOwl, 2022)
- When you want to use the results of a view in another statement ([Table-valued functions in SQL \(wiseowl.co.uk\)](#), WiseOwl, 2022)
- When you want to format text or data in the same way multiple times ([Functions-02 User Defined Functions UDFs - YouTube](#), RRoot, 2022)
- When you want to include multiple statements, such as one or more Insert statements along with returning a resulting table. ([Multi-Statement Table-Valued Functions \(wiseowl.co.uk\)](#), WiseOwl, 2022)

Differences between Scalar, Inline and Multi-Statement Functions

The syntax of a SQL Function differs from a SQL View and includes specified Return values. A Function must specify the type of value or table that will be returned. A function that returns a single value is defined as a *Scalar* Function. Functions that return a table value are defined as Table-Valued Functions. Table-Valued Functions can be either referred to as *Inline* or **Multi-Statement** Functions.

Scalar Functions

A Scalar Function is a function that returns a single value. The single value is defined in the Function syntax by placing the datatype of the return value after the Returns keyword. The Scalar Function also requires the Begin/End keywords within the Function definition. ([Functions-02 User Defined Functions UDFs - YouTube](#), RRoot, 2022)

```

Create Function fScalarFunction()
Returns int
As
    Begin
        Return 2
    End;

```

Figure 1: Example of a simple Scalar Function

Inline Table-valued Functions

An Inline Function is a Function that returns a table result. Like the Scalar function, the Inline function specifies the return result by defining the return value following the Returns keyword in the Function. Rather than defining the value as a scalar datatype, the Inline Table-valued Function uses the Table datatype following the Returns. Unlike the Scalar Function or the Multi-Statement Table-Valued Function, the Begin and End statements are not required.

```

Create Function fInlineFunction()
Returns Table
As
    Return
        Select * From dbo.Categories;

```

Figure 2: Example of a simple Inline Function

Multi-Statement Table-valued Functions (MSTVF)

A Multi-Statement Table-valued Function (MSTVF) is a function that returns a table and includes multiple statements. The statements are included between Begin/End keywords. Like the Inline Table-Valued Function, the MSTVF specifies the Returns value with a Table. Unlike the Inline Table-Valued Function, this table must be defined as a variable. This variable is then used in the statements within the function ([SQL Server Programming Part 10 - Table Valued Functions - YouTube](#), WiseOwlTutorials, 2022)

```

Create Function fMultiStatementFunction()
Returns @MSTable Table(
    Value1 int,
    Value2 int
)
As
Begin
    Insert Into @MSTable
    Values
        (1, 2),
        (3, 4);
    Insert Into @MSTable
    Values
        (5, 6),
        (7, 8);
Return
End

```

Figure 3: Example of a basic Multi-Statement Table-Valued Function

Summary

Assignment 07 covered a variety of system functions along with User Defined Functions. The User Defined Function is valuable when the same code may be run repeatedly, and the result set may vary based on a parameter. The UDF is also valuable when there are multiple statements being run in combination. In some cases, the input and output for a view or function would be the same. Choosing may then depend on an accessing application or the preferences and skillsets of the database users.