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IT FDN 130 Foundations of Databases and SQL Programming
https://github.com/nicknogrady/DBFoundations

Introduction
This document will explain when to use a SQL User-Defined Function. It will also explain the difference between Scalar, Inline and Multi-Statement Functions.

When to Use A UDF
Different from a view, a User Defined Function can accept parameters, and return either a tabular or a single piece of data. A User Defined Function can be used to save a calculation and be used again in the database. Rather than repeating complex code, the user can save it as a function to save time, as well as have faster execution.

Finally a User defined function is not built into the database, like SUM(), AVG(), etc., they capture the specific calculations or logic of the user (*User-Defined Functions - SQL Server | Microsoft Learn*, 18 July 2025, https://learn.microsoft.com/en-us/sql/relational-databases/user-defined-functions/user-defined-functions?view=sql-server-ver17. Accessed 25 August 2025.).

Scalar Function
A Scalar function returns a single value as requested in the `RETURNS` clause. For example, the following statement would return a single row of 102, as defined by the request for an integer via `INT`.

```
CREATE or ALTER FUNCTION dbo.fAddNumbers
(@a FLOAT, @b FLOAT)
RETURNS INT
AS
BEGIN
RETURN @a + @b
END
GO
SELECT dbo.fAddNumbers(100, 2)
```

Inline Functions
An Inline function returns a table that is the result of a single select statement. Take the following statement as an example:

```
CREATE OR ALTER FUNCTION
dbo.fProductInventoriesWithPreviousMonthCountsWithKPIs0()
RETURNS TABLE
AS
RETURN
SELECT ProductName, InventoryDate, Count, PreviousMonthCount,
CountVsPreviousCountKPI
FROM dbo.vProductInventoriesWithPreviousMonthCountsWithKPIs
WHERE CountVsPreviousCountKPI = 0
```

This function returns a table with 5 columns: ProductName, InventoryDate, Count, PreviousMonthCount and CountvsPreviousCountKPI. However, the `WHERE` clause in the function means that only results where the CountvsPreviousCountKPI value is 0 are returned.

Multi-Statement Functions
A Multi-Statement function returns a table to an explicitly specified structure and can include multiple variables. In the code below, I have added to the inline example above, but the function defines the table structure as well as adds another parameter.

```
CREATE OR ALTER FUNCTION
dbo.fProductInventoriesWithPreviousMonthCountsWithKPIs10()
RETURNS @Result TABLE
(ProductName NVARCHAR(100),
InventoryDate DATE,
Count INT,
PreviousMonthCount INT,
CountVsPreviousCountKPI INT)
AS
BEGIN
INSERT INTO @Result
SELECT ProductName, InventoryDate, Count,
PreviousMonthCount,CountVsPreviousCountKPI
FROM dbo.vProductInventoriesWithPreviousMonthCountsWithKPIs
WHERE CountVsPreviousCountKPI = 0
AND ProductName = 'Alice Mutton’
RETURN
END
```

Summary
This document explored User Defined Functions,, when to use them and their purpose. Additionally it explained the similarities and differences between Scalar, Inline and Multi-Statement Functions.