Nicholas Mei
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IT FDN 130 A Su 24: Foundations Of Databases & SQL Programming
Module 07: Functions – Assignment 07
Github URL: https://github.com/nmei-42/DBFoundations

SQL Functions

Introduction

In this assignment, I will be discussing two topics. First, I will discuss when a SQL User Defined Function (UDF) should be used. Then, I will be discussing the differences between Scalar, Inline, and Multi-Statement SQL Functions.

SQL function use cases

As discussed in the previous assignment, SQL functions are like functions in other programming languages[1]. They take in parameters, perform calculations/actions, and return the result[1]. When should they be used though? One great use case for SQL functions is when a calculation or action needs to be repeated multiple times[1,2]. A function only needs to be written once, can be reused any number of times, and can be maintained separately from the rest of SQL script[1,2]. This can cut down errors like typos if the calculation needs to be repeated many times and improve readability, especially if the calculation is complex and takes up many lines. SQL functions should also be considered if improving runtime performance is important. A SQL function can have its query plan cached which avoids parsing and optimization time costs[1]. A SQL function used to do filtering in a WHERE clause can also reduce the number of rows that need to be sent to a client, which reduces network bandwidth costs for queries[1].

Differentiating scalar, inline, and multi-statement SQL functions

Scalar functions take in one or more parameters and return a single value of a specific data type (e.g. int, float, date, money, etc.)[1]. “Inline” and “multi-statement” are a bit more complicated to explain since they are somewhat overloaded terms, at least in the context of Microsoft SQL Server. The most common usage of an “inline function” refers to an “Inline table-valued function” (ITVF)[3,4]. ITVFs take in one or more parameters and return a table data type[1,3]. IVTFs lack a function body and generally only consist of parameter declarations and a SELECT statement[1,3,4]. The most common usage of a “multi-statement function” refers to “multi-statement table-valued functions” (MSTVF)[3,4]. MSTVs also take in one or more parameters and return a table data type[3,4]. However, unlike IVTFs, the syntax of an MSTV is more complex in that they consist of parameter declarations, a discretely defined table to return, and can contain other SQL statements in addition to SELECT such as INSERT[3,4].

One confusing aspect of referring to “inline” and “multi-statement” functions is that “inlining” is also a general term in computer science that refers to optimization techniques that trade more memory use for faster speed[5]. As of SQL Server 2019, it is possible to “inline” scalar UDFs to improve performance since Scalar UDFs have previously not always had great performance[6]. “Multi-statement” is also a bit of an overloaded term for SQL Server, as its documentation also

mentions “multistatement scalar functions” which are defined as functions whose body “can contain a series of Transact-SQL statements that return [a] single value”[1,6].

Summary

In summary, I’ve described how UDFs should be used to reduce repetitive code and improve overall performance of SQL code. I have also explored differences between common definitions of scalar, inline, and multi-statement SQL functions. Finally, I’ve also briefly explored potentially confusing overloaded terms like “inlined scalar UDFs” and “multistatement scalar functions”.

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