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Assignment 06
https://github.com/eokikawa/DBFoundations

Understanding SQL Views, Functions, and Stored Procedures

Introduction

This paper explores the roles and functionalities of SQL views, functions, and stored procedures in database management. It emphasizes how each contributes to simplifying complex queries, supporting code reusability, and enhancing security and performance. The paper also highlights the differences in how these components handle parameters and data modification.

Explain when you would use a SQL View.

A view is a virtual table that is based on the results of a SQL statement. In particular, a "Reporting View" is used to extract data for reporting purposes. These views typically save complex SELECT statements, but can save simple ones as well; complex SELECT statements can include a join, column aliases, concatenation, and the choose function. Views are useful because they condense complex SQL code into a simple SELECT statement that can be referenced in longer queries.

It's important to note that creating a view does not run the select code–the creation of the view is about defining and storing the query, not about retrieving or processing the data at that moment.

One thing to be aware of is that views cannot dictate how that data is stored, so in some RDBMS you can use the TOP clause as a workaround to allow an ORDER BY clause. In this case, you would reference "TOP 1000000000" using a large enough number to capture the entirety of the return. You could also add the ORDER BY clause when you select from the view. It's best to ask how your organization prefers to handle these cases.

Explain the differences and similarities between a View, Function, and Stored Procedure.

View: A view is a virtual table representing the result of a SELECT query. It is used to simplify complex queries and enhance security by restricting access to specific rows and columns.

Function: A function, often called User Defined Functions (UDFs), is a reusable routine that can perform calculations, return a single value (scalar functions), or a table (table-valued functions).

Stored Procedure: A stored procedure (Sprocs or Procs) is a set of SQL statements that can perform complex operations including conditional logic, loops, and transactions.

The creation of views, stored procedures, and functions that return tables all operate very similarly. However, unlike views, functions can use parameters to change the results of a query as it is executed. While views cannot use parameters, a similar result can be reached by applying a WHERE clause. Unlike views, you can create UDFs to return a single (scalar) value as an expression, which is very useful.

In terms of returns, views return a virtual table, functions either return a single value or a table, and stored procedures can return multiple result sets, output parameters, or integer status codes.

For modifications to the database, views are read-only, functions are generally read-only, and stored procedures can perform read and write operations, including modifying data in the database.

Views, functions, and stored procedures encapsulate and reuse SQL logic, simplifying operations and promoting code reusability while organizing and modularizing SQL code for easier maintenance. They also enhance security by controlling data access.

Summary

SQL views serve as virtual tables for simplifying complex queries without immediately processing data, while functions provide reusable routines that can accept parameters and return values. Stored procedures are versatile, performing complex operations and modifying data. Despite their differences, views, functions, and stored procedures collectively improve database code organization, security, and performance optimization.