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IT FDN 130 A Wi 22: Foundations of Databases & SQL Programming

Assignment 06: Views, Functions, and Stored Procedures

GitHub Link for Class Repository [EXTERNAL LINK]

Views, Functions, and Stored Procedures: Protecting Your Database and Ensuring Stakeholder Experience

Introduction

In real world applications, databases are used to both organize data and explore that information through queries. As your SQL code gets more complex and you roll your database out to wider groups of end users, it is helpful to be able to save parts of your SQL code to the database, allowing you to re-use the code later in further database design or reporting. By using Views, Functions, and Stored Procedures, you can make your database more efficient and responsive to developer and end-user needs. Within the wider field of computer science, this is known as creating abstraction layers within your database, allowing for repeated work to be functionalized and remove the unnecessary technical details for end-users.

Utilizing Views in SQL Databases

In SQL, a View is simply a saved SELECT statement. While calling the view in a query will give you the results as a table, the View is not actually storing the table itself, but rather a dynamic SQL statement that runs again each time. Views are created to protect the underlying efficacy of your database's tables and make it easier to customize reporting for end-users while maintaining the Normal Forms.

There are two types of Views that are commonly used in SQL: Basic (or Base) Views and Reporting Views. Every table within your database should have a basic (or base) view which represents the full set of data housed within that table. You can then restrict access to the database's raw table while allowing access to this newly created base view. Users can perform the same queries as they would on the raw data, without risk to the structure of the database. As opposed to Basic Views, which represent a full picture of an underlying table's data,

Reporting Views are used for situations where the query is being used in a report, and thereby filtered or joined with additional data to meet stakeholder needs.

Exploring Views, Functions, and Stored Procedures

Along with Views, Functions and Stored Procedures are two additional tools that allow you to better serve stakeholder needs while protecting the structure and information held in your underlying database.

As mentioned above, Views are saved SELECT statements that allow users to see either a direct view of the table's data (as with a Basic or Base View) or a view that aligns with a reporting need (as with a Reporting View).

User Defined Functions (UDFs), which can be custom built by the user as opposed to the readily available system functions, build on the concept of a View but with the addition of parameters which can be optionally defined and included within a function's open parenthesis. There are two types of functions: Table Functions, which returns a table like a View, and a Scalar Function, which returns one value.

Stored Procedures work the same as Views and Functions in that they allow you to name and subsequently call a repeating action within your database. However, Views and Functions are limited to the results of one SELECT statement. This means that the results of a View or Functions when called through a SELECT statement will always be in the form of a table or scalar value. Stored Procedures can execute the same functionality as Views or Functions, along with the ability to process multiple transaction statements within one procedure.

Summary

A proper database must meet two important criteria: 1. It must be able to successfully store and process information, and 2. It must be useful to end-users who rely on data for their jobs. These two essential tasks can be accomplished by utilizing Views, Functions, and Stored Procedures within your database design. While Views, Functions, and Stored Procedures each have a multitude of unique uses, they all represent a way for database developers to protect the integrity of their raw data, ensure ease of access to reporting and common queries, reduce the knowledge gap for less-technical users, and remove redundancies for future development.

Resources for Background Research

Root, Randal. "Module 06 – Views, Functions, and Stored Procedures." Randal Root, 15 Feb. 2022.