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Course: IT FDN 130 A Au 25: Foundations of Databases & SQL Programming

Assignment06

Github URL: <https://github.com/abigley2004/DBFoundations>

Introduction

In the sixth week of the course, I was introduced to SQL views and their role in organizing and simplifying data retrieval within a relational database. Views allowed me to encapsulate **SELECT** statements into reusable virtual tables that present data in a clear and meaningful format. This approach not only reduces repetition in queries but also supports better security and maintenance by abstracting the underlying table structures. Along the way, I also examined how views compare to functions and stored procedures, each of which serves a different purpose in structuring logic within the database. Together, these tools demonstrate how SQL supports both efficient data access and the creation of modular, maintainable database systems.

Academic Attribution Note:

I completed the coding and Q&A assignments independently after reviewing the course videos and materials. I used ChatGPT only to improve the clarity of my explanations and confirm the accuracy of my SQL concepts. The final work reflects my own understanding of the material.

1. Explain when you would use a SQL View.

A SQL view is useful to simplify how users retrieve data from one or more tables. In a well-designed database, information is stored across multiple related tables, which can make queries long or difficult for users who do not need full control over the underlying structure. A view provides a saved, reusable **SELECT** statement that presents the data as if it were a single table, allowing users to work with organized and meaningful results without writing complex joins or filters themselves. Views are also helpful for improving security, because they can expose only the specific columns or rows that users should see while hiding the underlying tables. In addition, views promote consistency by ensuring that everyone retrieves data using the same approved logic.

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

A view, function, and stored procedure are all database objects used to organize and reuse SQL logic, but they differ in how they operate and how they are used within a system.

Object	Differences	Similarities
View	A view is a virtual table that stores a predefined SELECT statement. It cannot accept parameters and is generally used to simplify data retrieval. Views are often schemabound to protect the underlying tables.	Like functions and stored procedures, a view encapsulates SQL logic and can be reused to promote consistency and simplify queries.
Function	A function must return a value and cannot modify data. It can accept parameters and is commonly used for calculations, expressions, or returning table-valued results. Functions cannot execute actions such as INSERT , UPDATE , or DELETE . There are two basic types: Those that return a table of values and those that return a single (scalar) value.	Functions, like views and stored procedures, store SQL logic that can be called repeatedly and help keep code organized.
Stored Procedure	A stored procedure can perform complex operations, accept parameters, and modify data using INSERT , UPDATE , and DELETE statements. It does not have to return a value. Procedures can include control-of-flow logic such as IF statements and loops.	Stored procedures also encapsulate SQL logic and promote reusability, similar to views and functions, and they provide a structured way to perform repeated tasks.

SQL code examples of each, using the material from this week's homework.

Object	SQL Code and Use Example
View This view exposes basic product information.	<pre> CREATE VIEW dbo.vwProductsBasic WITH SCHEMABINDING AS SELECT p.ProductID, p.ProductName, p.CategoryID, p.UnitPrice FROM dbo.Products AS p; GO </pre>

Object**SQL Code and Use Example**

	<p>Use:</p> <pre>SELECT ProductID, ProductName, UnitPrice FROM dbo.vwProductsBasic ORDER BY UnitPrice;</pre>
<p>Function</p> <p>This scalar function returns a discounted price for a given product. The number of items and discount rate are passed in as function parameters.</p>	<pre>CREATE FUNCTION dbo.fnGetProductDiscountedPrice (@ProductID INT, @DiscountRate DECIMAL(4,2) -- e.g., 0.10 for 10%) RETURNS MONEY AS BEGIN DECLARE @BasePrice MONEY; SELECT @BasePrice = p.UnitPrice FROM dbo.Products AS p WHERE p.ProductID = @ProductID; RETURN @BasePrice * (1 - @DiscountRate); END; GO</pre> <p>Use:</p> <pre>SELECT dbo.fnGetProductDiscountedPrice(1, 0.10) AS DiscountedPrice;</pre> <p>Use as a query:</p> <pre>SELECT p.ProductID, p.ProductName, p.UnitPrice, dbo.fnGetProductDiscountedPrice(p.ProductID, 0.15) AS PriceWith15PercentOff FROM dbo.Products AS p;</pre>

Object	SQL Code and Use Example
Stored Procedure This stored procedure returns products with a minimum unit price as a parameterized query over product unit price.	<pre> CREATE PROCEDURE dbo.uspGetProductsByMinPrice (@MinPrice MONEY) AS BEGIN SET NOCOUNT ON; SELECT p.ProductID, p.ProductName, p.CategoryID, p.UnitPrice FROM dbo.Products AS p WHERE p.UnitPrice >= @MinPrice ORDER BY p.UnitPrice DESC; END; GO Use: EXEC dbo.uspGetProductsByMinPrice @MinPrice = 20.00; </pre>

Together, these objects help developers simplify queries, enforce consistent logic, and organize database operations in a maintainable way.

Summary

By the end of this lesson, I gained a deeper appreciation for how views streamline complex queries and help enforce consistent reporting across applications and users. Creating both simple and multi-table schemabound views reinforced the importance of explicit column selection, stable table relationships, and careful ordering of results. Exploring functions and stored procedures alongside views highlighted how each object contributes to a layered design, where views simplify data retrieval, functions provide reusable calculations or table-valued results, and stored procedures support more advanced data operations. These combined techniques improve clarity, security, and maintainability in database systems, and they establish a solid foundation for the more advanced SQL topics that follow.