Madeline Miller
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Foundations Of Databases & SQL Programming
Assignment 06

Views, User Defined Functions, and Stored Procedures

Introduction

Views, user defined functions, and stored procedures provide ways to easily reproduce work related to manipulating and viewing the data we want to interact with. This document reviews when SQL views might be used and what issues or challenges they can help to address, as well as the differences and similarities between views, functions, and stored procedures in SQL.

When to Use SQL Views

A view saves a select statement in the database and acts as an abstraction layer.

Views provide a simple way to save complex queries so that those results can be accessed again without needing to understand or rewrite the query. They can also be used to make it easy to extract data for frequently used reports (if used for reports, they are called 'Reporting Views'). If alterations to database design are made, views allow continued use of the data without disruption from backend changes.

Figure 1: View created and user can use a simple query to retrieve data from that view without being impacted by other database changes in future.

Protect data

Views provide restricted access to a table that allow users to view and work with the data without being able to alter the original table. If you imagine sharing editing permissions for a google sheet, the likelihood that someone will accidentally alter the data is increased the more people that are added. In setting up a view in SQL, this protects the data while allowing people to manipulate it with select statements. If a view is set up with ***Schemabinding*** (which binds the

view to the tables it's based on), this can also protect original tables from being dropped or altered in a way that would impact the views associated with that table

Views can allow users access to some columns of the data while keeping others private. By denying and granting what tables different categories of users can access, it's possible to share data with more users as sensitive columns can be hidden from the views.

```
USE Assignment06DB_MadelineMiller
DENY SELECT ON Categories TO Public;
GRANT SELECT ON vCategories TO Public;
GO
```

Figure 2: Example of denying and granting select access

View, Function, Stored Procedure

Views, functions, and stored procedures are all statements stored within the database.

Views

Views are a single select statement, and are primarily used for querying and viewing data.

```
CREATE VIEW biggeredtable
AS
    SELECT ProductName, UnitPrice, UnitPrice + 30 AS biggeredprice
    FROM vProducts;
GO
```

ProductName	UnitPrice	biggeredprice
Chai	18.00	48.00
Chang	19.00	49.00
Aniseed Syrup	10.00	40.00
Chef Anton's Cajun Seasoning	22.00	52.00
Chef Anton's Gumbo Mix	21.35	51.35
Grandma's Boysenberry Spread	25.00	55.00

Figure 3: Defined View and the results it returns when called with a select

Functions

Functions are a block of code that can take input (parameters) and return results. There are two basic types:

Scalars Functions: return a single value
Table Valued functions: return a table (much like a view)

While a table valued function looks similar to a view, tables can also take parameters in a way that views cannot! Views can adjust with a WHERE clause in the select statement that calls them, but for more complex formulas a function provides a way to quickly return results based on set parameters.

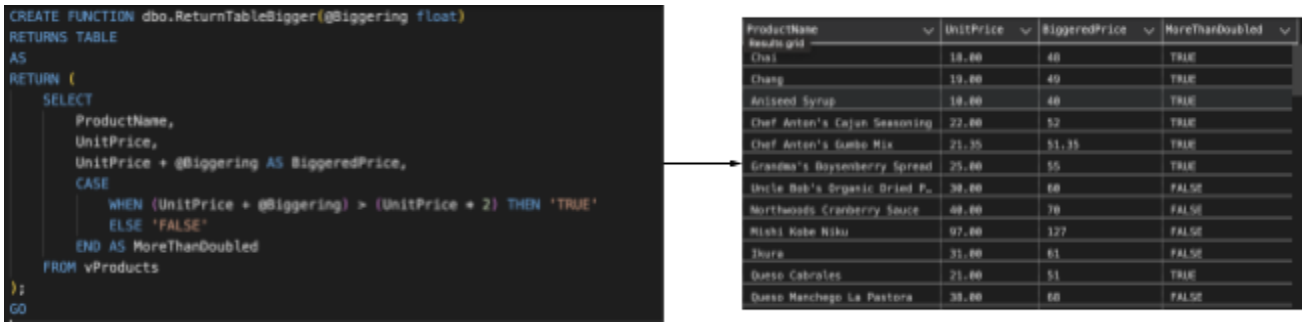

Figure 4: Defined function and the results it returns when called with a select

Stored Procedures

Stored procedures, like functions, also can take parameters. They are a block of coded procedures that can be executed to achieve different results, and can return no results (but may have had other impacts if executed) or many results! In the below example, the procedure returns two separate tables.

Figure 5: Defined procedure and the results it returns when called with an execute

Similarities and Differences

	View	User Defined Functions	Stored Procedure
SQL Statement(s) stored in the Database	Yes - a single SELECT Statement	Yes - reusable block of code	Yes- can contain multiple statements of different kinds
Can return a table	Yes - one	Yes - Table Valued Function	Yes
Can return a single value	No (only returns a single table)	Yes - Scalars Functions	Yes
Can return multiple tables and/or values	No	No	Yes
Can return no results	No	No	Yes
Can use Parameters	No	Yes	Yes
Used with a select statement	Yes	Yes	No - Need execute command
Schemabinding	Yes	No	No

Table: Similarities and Differences between SQL Views, Functions, and Stored Procedures

Summary

- Views are useful for reusable, protected data that people can interact with without making accidental changes to the tables.
- Views, Functions, and Stored Procedures are similar in that they are SQL statements stored in the database that CAN perform similar functions, but different in setup and possible inputs, outputs, and applications.