

Genevieve Lim

November 18, 2022

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

Assignment 06

GitHubURL: <https://github.com/genevivelim/DBFoundations>

SQL Views, Functions, & Stored Procedures

Introduction

The purpose of this document is to provide a basic overview of SQL Views, Functions, and Stored Procedures, which are tools used to create a database's abstraction layer. An abstraction layer is a method of hiding the working details of a database's functionality while presenting queried data to the database user. In this document, we will discuss the purpose of each abstraction method, the similarities and differences between them, and the benefits of implementing SQL Views.

What is a SQL View?

A SQL View is essentially a Select Statement that is saved in the database by a given name. This saved query produces a virtual table composed of columns and rows of data from one or more tables in the database. Views are created using the Create View statement, as shown by the example code below. ("SQL Views." W3 Schools, https://www.w3schools.com/sql/sql_view.asp. Accessed 18 Nov. 2022.) (External Site)

```
CREATE VIEW [Brazil Customers] AS  
SELECT CustomerName, ContactName  
FROM Customers  
WHERE Country = 'Brazil';
```

When is a SQL View used?

There are many benefits to creating SQL Views. First, Views store simple to complex database queries that result in virtual tables. They can contain Select Statements that summarize data from one or more tables, which simplify operations for novice database users. Similarly, a View can store complex code, making it easily accessible for repeated use. A View also allows for flexibility and customization as multiple Views can be created to generate various types of reports depending on individual user needs. With Views, the same dataset can be seen by different users in multiple ways at the same time. ("SQL - Using Views." TutorialsPoint, <https://www.tutorialspoint.com/sql/sql-using-views.htm>. Accessed 18 Nov. 2022.) (External Site)

Second, Views ensure the security of the data that is stored in the database. A View restricts user access to the actual dataset, only allowing users to see a subset of the data. In most conditions, users cannot

make updates in a View. As a result, a database developer can also modify or update the database with minimal effect to what the user sees. (Root, Randal. "Views, Functions, and Stored Procedures." IT Foundations 130, University of Washington, 9 Nov. 2022. Notes. Accessed 18 Nov. 2022.)

What is a SQL Function?

A SQL Function is like a SQL View in that it stores SQL Statements in the database. However, unlike a View, a user can specify parameters in a Function and change the results of the saved query. SQL Server has many useful built-in functions, but a user can create custom functions also called User Defined Functions (UDFs). (Root, Randal. "Views, Functions, and Stored Procedures." IT Foundations 130, University of Washington, 9 Nov. 2022. Notes. Accessed 18 Nov. 2022.)

There are two basic types of functions. One type of a Function returns a table of values, while the second type returns a single or scalar value. Functions are created using the Create Function statement as shown by the example code below. (Root, Randal. "Views, Functions, and Stored Procedures." IT Foundations 130, University of Washington, 9 Nov. 2022. Notes. Accessed 18 Nov. 2022.)

```
Create Function dbo.fProducts() # Using the dbo prefix is common in Microsoft
SQL Server
Returns Table
AS
Return(
    Select ProductID, ProductName, CategoryId, Discontinued
    From Northwind.dbo.Products
);
go
Select * from dbo.fProducts();
Go
```

What is a SQL Stored Procedure?

A SQL Stored Procedure is similar to a SQL View and a SQL Function in that it is also composed of a set of SQL statements saved in the database. It is yet another way to store complex code in a database file for repeated use. However, an advantage of a Stored Procedure is that it can have multiple varieties of statements, allowing for more complex reporting.

One similarity between a Function and a Stored Procedure is that both can use parameters to change the results of the saved query. In terms of syntax, a Stored Procedure is most similar to a View. It is created using a Create Procedure statement, but results are obtained using the Execute command as shown by the example code below. Unlike a View or a Function, a user cannot use a Select Statement to obtain results from a Stored Procedure. (Root, Randal. "Views, Functions, and Stored Procedures." IT Foundations 130, University of Washington, 9 Nov. 2022. Notes. Accessed 18 Nov. 2022.)

```
Create Procedure pProducts()  
AS  
    Select ProductID, ProductName, CategoryId, Discontinued  
        From Northwind.dbo.Products;  
go  
Execute pProducts();  
Go
```

Summary

The purpose of this document is to provide a basic overview of SQL Views, Functions, and Stored Procedures, which are tools used to create a database's abstraction layer. A SQL View is a Select Statement that is saved in the database by a given name. This saved query produces a virtual table composed of columns and rows of data from one or more tables in the database. Benefits of creating SQL Views include customized queries and reporting, storing complex code for later use, ensuring data security by limiting user access to the data, and allowing database developers to modify the database with minimal effect to what users see.

SQL Views, Functions and Stored Procedures are all similar in the way they store SQL statements in a database. However, unlike a View, a user can specify parameters in a Function and a Stored Procedure, changing the results of the saved query. In addition, an advantage of a Stored Procedure is that it can have multiple varieties of statements, allowing for more complex reporting.