

## 5 Assignment 7. Functions

### 6 Introduction

7 This document discusses user-defined functions, when they are used, and the different types. The first section  
8 provides a description of three common use cases for user-defined functions and the benefits they offer. The second  
9 goes into more detail on the two different types of user-defined functions and how each is used.

### 11 When to Use User-Defined Functions

12 User-defined functions are flexible tools that can be used in many ways. Three main uses for user-defined functions  
13 are: 1) to create modular code for efficiency, 2) as a pre-defined result set of table data, and 3) to reference other  
14 tables in a check constraint. While these examples do not represent all uses for user-defined functions, they provide  
15 an overview of common ways in which these functions are often used.

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17 In the first use case, a function enables one to write a set of SQL code that can then be used repeatedly by many  
18 users working with the database. This is a useful feature when working with complex calculations. A single function  
19 will act as a source of truth when calculating a key performance indicator (KPI) to ensure different users all leverage  
20 the same calculation. In addition, by accepting parameters, user-defined functions make it easy to extract variations  
21 of results sets based on a specific value (e.g., returning total orders for a region by adjusting a country ID parameter).

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23 Secondly, functions offer an alternative to creating table views. Like a view, functions can return a pre-defined result  
24 set that can be used by many other database users. While the process is slightly more complex, it is an additional  
25 way to create a specific result set that can be shared among users. It also offers the added benefit of including  
26 parameters that users can adjust to alter the result set.

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28 Finally, user-defined functions provide a way to reference a column from a different table in the database as part  
29 of a check constraint. While this cannot be done with a check constraint by default, using a function that includes  
30 the column allows users more flexibility when constructing these constraints.

### 32 Types of User-Defined Functions

33 There are two types of user-defined functions: scalar functions and table-valued functions. As the names suggest,  
34 scalar functions return a specific value while table-valued functions return a result set. Scalar functions can be used  
35 by themselves in a SELECT statement to return the single value itself or with other clauses to calculate values for  
36 each row returned in a result set. Table-valued functions return a result set and are referenced like how other table  
37 objects are referenced in the FROM clause.

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39 Diving deeper, table-valued functions can further be divided into two sub-types: in-line and multi-statement. In-line  
40 table-valued functions are the simpler of the two sub-types. They return a result set based on defined parameters  
41 used in a pre-built SELECT statement. Multi-statement table-valued functions are more complex and return a result  
42 set based on defined parameters and a table created within the function itself.

### 44 Summary

45 As discussed in the sections above, user-defined functions are SQL tools that enable users to share calculations,  
46 create pre-defined result sets, and work with more complex constraints. The two primary flavors of user-defined  
47 functions are scalar functions and table-valued functions. Each type of function offers unique benefits that can be  
48 used in a variety of different situations.

## References

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