

User-Defined Query Language Functions

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Introduction

Nearly all database users are familiar with the idea of a *function* or have used one at some point while writing a query.

```
sqrt(2) → 1.4142135623730951
```

```
length('some text') → 9
```

```
jsonb_extract_path_text('{ "a": "b" }', 'a') → 'b'
```

A *user-defined function* is a function created by a database user. We will look at a special kind of user-defined function called a *user-defined query language function*, which is described entirely in SQL, and we will learn how to create one.

This method can be used to create reports.



A sample SQL query

Suppose we have a query that counts the number of loans in a library for each circulated item within a range of dates:

```
SELECT item_id,
       count(*) AS loan_count
FROM folio_circulation.loan__t
WHERE '2023-01-01' <= loan_date AND
      loan_date < '2024-01-01'
GROUP BY item_id;
```

The range of dates is defined by a start and end date, in this case, '2023-01-01' and '2024-01-01'.

We can make this query more general by defining the start and end dates as *parameters* in a user-defined function.

The query as a function

```
CREATE FUNCTION lisa.count_loans(  
    start_date date DEFAULT '2000-01-01',  
    end_date date DEFAULT '2050-01-01')  
RETURNS TABLE(  
    item_id uuid,  
    loan_count integer) AS  
$$  
SELECT item_id,  
       count(*) AS loan_count  
FROM folio_circulation.loan__t  
WHERE start_date <= loan_date AND  
       loan_date < end_date  
GROUP BY item_id  
$$  
LANGUAGE SQL;
```


Sharing the function

Suppose that a user `lisa` has created `lisa.count_loans` and would like to share it with the users `celia` and `rosalind`, so that they also can call it.

First we have to grant them the privilege to use the `lisa` schema (unless that has been done before):

```
GRANT USAGE ON SCHEMA lisa
    TO celia, rosalind;
```

Then grant the privilege to execute the function:

```
GRANT EXECUTE ON FUNCTION lisa.count_loans
    TO celia, rosalind;
```

This method can be used with a web-based database tool such as CloudBeaver to make reports available to users that do not have a database tool installed locally.

