# Exercise 6: SQL for spatial queries

## Introduction:

This assignment explores different combinations of spatial operations:

Selecting by non-spatial attributes.

Selecting data by spatial properties.

Selecting data by location.

Combination of spatial operations:

## Query:

### Selecting buildings for the non-spatial attributes.

Execution of the query to select all school buildings on Salzburg Figure 1. This query is not spatial, it is created through the description of a column type.

Selection of school and church type Figure 1, Figure 2, Figure 3.



Figure 1: Query Salzburg Schools.

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Figure 2: School query.



Figure 3: School and church query.

#### Selecting data by spatial properties:

The function 'st\_area' calculates the area with the geometry of the coordinates from the database. This query indicates the creation of a new area column for the 'type schools' Figure 4, Figure 5.



Figure 4: School area query.



Figure 5: Schools buildings classified by area.

#### Selecting data by location:

The following lines are queries executed in respect of the location.

- 1. The query permits to calculate the cross product from all distances, Figure 6. Figure 7 shows the distance through the 'Glockenturm' to the layer of buildings in the city of Salzburg.
- 2. The query showing the average of the distance to the centre cannot be added as a map layer. The query can be found on the Figure 8.
- 3. The Visualization, query of 500 m buffer from 'Glockenturm', Figure 9, Figure 10.

4. The Visualization, query of 1000 m buffer from 'Glockenturm'. The total number of buildings in this area is 1906, Figure 11, Figure 12.

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Figure 6: Query for the distance from Glockenturm to the buildings of the city of Salzburg.



Figure 7: Distance from Glockenturm to the buildings of the city of Salzburg.

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*Figure 8: Query of average distance of the buildings from a reference point.* 

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Figure 9: Query of 500 m buffer from Glockenturm.



Figure 10: Visualization, query of 500 m buffer from Glockenturm.



Figure 11: Query of counting the closest buildings from 1000m from Glockenturm.



Figure 12: Visualization, query of 1000 m buffer from Glockenturm.

#### Combination of spatial operations:

Of course, it is also possible to combine spatial operations and filters. The following images represent the average size of all buildings in a radius of 1km from the fortress 'Glockenturm'. The mean (average) of the buildings is 298.67m<sup>2</sup> Figure 11, Figure 12.

In order to do the query, it is defined by the following:

The data selected from the file and the columns

```
(" from
salzburg_buildings as b,
(SELECT geom FROM salzburg_buildings WHERE name = 'Glockenturm') as g")
```

Secondly, the condition of ("where") allows the selection from the data (" from"). The definition of the condition of ("where") in this case, has one function ("st\_distance")...

Finally, the principal function is defined inside ("select"), inside this, the average area of the buildings of the selected data can be written.



Figure 13: Calculation query of the average area from a distance zone building.



*Figure 14: Result 298.67m<sup>2</sup>, calculation query of the average area from a distance zone building.*