#### INFO-H-415 - Advanced Databases Academic year 2014 – 2015

For this session, we consider the following spatial relational diagram of the GeoNorthwind database.



**Exercise 1.** Give the total sales in 1997 to customers located in cities that are within an area whose extent is a polygon drawn by the user. For the purpose of the exercise, we will consider the following coordinates for the polygon's corners: **XXXX** 

Exercise 2. What are total sales to customers located in a state that contains the capital city of the country?

Exercise 3. Give the spatial union of the states in the USA where at least one customer placed an order in 1997.

Exercise 4. What is the distance between the customers' locations and the capital of the state in which they are located?

Exercise 5. For each customer, give the total sales amount to its closest supplier.

**Exercise 6.** Give the total sales amount for customers that have orders delivered by suppliers such that their locations are less than 200 km from each other.

**Exercise 7.** What is the distance between the customer and supplier for customers that have orders delivered by suppliers of the same country.

**Exercise 8.** Give the number of customers for European countries with an area larger than 50,000 km<sup>2</sup>.

Exercise 9. For each supplier, give the number of customers located at more than 100 km from the supplier.

Exercise 10. For each supplier, give the distance between its location and the centroid of the locations of all its customers.

# Solutions for Session 12 - Spatial Databases (3/3)

#### Solution to Exercise 1

```
SELECT C.CompanyName AS Customer,
Y.CityName AS City,
SUM(S.SalesAmount) AS TotalSales
FROM Sales S,
Customer C,
City Y,
Time T
WHERE S.CustomerKey = C.CustomerKey
AND C.CityKey = Y.CityKey
AND S.OrderDateKey = T.TimeKey
AND T.Year = '1997'
AND ST_Within(Y.CityGeo, 'SRID=4326;POLYGON((5.0 40.0, 100 40.0,
100.0 90.0, 5.0 90.0, 5.0 40.0))'::geometry)
GROUP BY C.CompanyName, Y.CityName, Y.CityGeo
```

Beware that you have to specify the SRID of the polygone and to "cast" the Geography-typed result to a Geometry type (with the ::geometry statement) because the function ST\_Within only accepts geometry. Note: To check your restults, you could add the following column to the query: ST\_AsText(Y.CityGeo) AS City.

#### Solution to Exercise 2

```
SELECT C.CompanyName AS Customer,
    SUM(S.SalesAmount) AS TotalSales
FROM Sales S,
    Customer C,
    City Y,
    State A,
    Country O
WHERE S.CustomerKey = C.CustomerKey
AND C.CityKey = Y.CityKey
AND Y.StateKey = A.StateKey
AND Y.StateKey = A.StateKey
AND A.CountryKey = O.CountryKey
AND ST_Contains(A.StateGeo,O.CapitalGeo)
GROUP BY C.CompanyName
```

### Solution to Exercise 3

```
SELECT ST_AsText(ST_Union(DISTINCT A.StateGeo)) AS States
FROM Sales S,
Customer C,
City Y,
State A,
Country O,
Time T
WHERE S.CustomerKey = C.CustomerKey
AND C.CityKey = Y.CityKey
```

```
AND Y.StateKey = A.StateKey
AND A.CountryKey = O.CountryKey
AND O.CountryName = 'United States'
AND S.OrderDateKey = T.TimeKey
AND T.Year = '1997'
```

#### ► Solution to Exercise 4

```
SELECT DISTINCT C.CompanyName AS Customer,
    ST_Distance(C.CustomerGeo,A.CapitalGeo) AS Distance
FROM Customer C,
    City Y,
    State A
WHERE C.CityKey = Y.CityKey
    AND Y.StateKey = A.StateKey
ORDER BY C.CompanyName
```

## Solution to Exercise 5

### Solution to Exercise 6

```
SELECT C.CompanyName AS Customer,
    SUM(S.SalesAmount) AS TotalSales
FROM Sales S,
    Customer C,
    Supplier U
WHERE S.CustomerKey = C.CustomerKey
AND S.SupplierKey = U.SupplierKey
AND ST_Distance(C.CustomerGeo,U.SupplierGeo) < 200
GROUP BY C.CompanyName
```