

Exercises for Spatial Databases and GIS

Sheet 4 (until 04.12.2009)

Exercise 1 (Spatial Queries)

Building(buildingId: *String*, typeOfUse: *String*, groundplan: *Polygon*)

Person(persNo: *Integer*, name: *String*, firstName: *String*, ...)

Owner(persNo: *Integer*, parcelId: *String*)

Parcel(Id: *String*, groundplan: *Polygon*)

1. Given the relations above, what does the following SQL query retrieve?

```
SELECT o.PersNo
FROM Owner o, Parcel p, Building b
WHERE o.persNo = p.persNo
AND b.typeOfUse= 'residential'
AND Contains(p.groundplan, b.groundplan)
AND Area(p.groundplan) > (SELECT max(Area(p2.groundplan))
                           FROM Parcel p2, Building b2
                           WHERE Touches(p.groundplan, p2.groundplan)
                           AND b2.typeOfUse = 'residential'
                           AND Contains(p2.groundplan, b2.groundplan))
```

2. Create an SQL query that retrieves for every person the number of his parcels and the area of all his residential buildings.

Exercise 2 (Overlay Operations)

Which geometry type(s) does the result of the following operations have?

1. Intersection of two polygons
2. Intersection of a line and a polygon
3. Intersection of a point and a line
4. Subtraction of a polygon from a polygon
5. Union of two polygons
6. Union of two lines

Exercise 3 (Approximations)

1. Which topological relations may occur between two spatial objects if the given topological relation exists between their conservative/ progressive approximations?
 - a) Disjoint
 - b) Equal
 - c) Contains
 - d) Overlap
2. Why do spatial indexes usually use a conservative approximation?
3. Under which circumstances would a progressive approximation be more suitable than a conservative one?