

## Exercises for Spatial Databases and GIS

### Sheet 3 (until 27.11.2015)

#### Exercise 1 (Geometric Operations)

1. Determine the intersection and the union of the Polygons P1 and P2 without drawing them.

- a. Vector geometry :

P1((2,1), (7,1), (7,3), (3,3), (3,6), (11,6), (11,8), (9,8), (9,13), (2,13))

P2((6,2), (10,2), (10,7), (8,7), (8,9), (12,12), (12,14), (5,14), (5,10), (1,10), (1,8), (4,8))

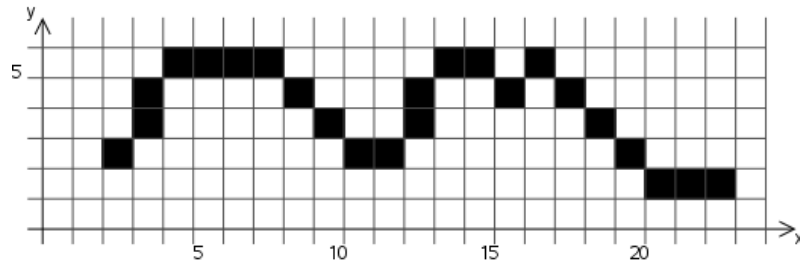
- b. Raster geometry

P1((3,2), (4,2), (5,2), (6,2), (7,2), (3,3), (4,3), (5,3), (6,3), (7,3), (3,4), (3,5), (3,6), (3,7), (4,7), (5,7), (6,7), (7,7), (8,7), (9,7), (10,7), (11,7), (3,8), (4,8), (5,8), (6,8), (7,8), (8,8), (9,8), (10,8), (11,8), (3,9), (4,9), (5,9), (6,9), (7,9), (8,9), (9,9), (3,10), (4,10), (5,10), (6,10), (7,10), (8,10), (9,10), (3,11), (4,11), (5,11), (6,11), (7,11), (8,11), (9,11), (3,12), (4,12), (5,12), (6,12), (7,12), (8,12), (9,12), (3,13), (4,13), (5,13), (6,13), (7,13), (8,13), (9,13))

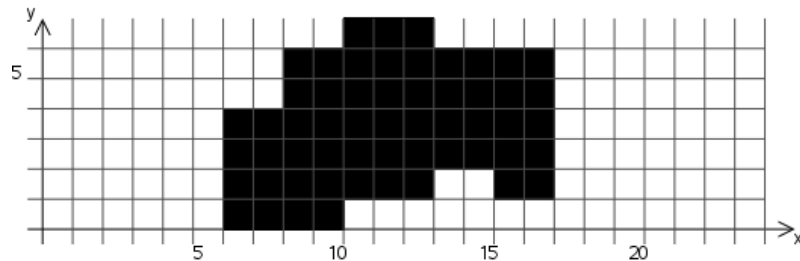
P2((7,3), (8,3), (9,3), (10,3), (7,4), (8,4), (9,4), (10,4), (6,5), (7,5), (8,5), (9,5), (10,5), (6,6), (7,6), (8,6), (9,6), (10,6), (5,7), (6,7), (7,7), (8,7), (9,7), (10,7), (5,8), (6,8), (7,8), (8,8), (2,9), (3,9), (4,9), (5,9), (6,9), (7,9), (8,9), (2,10), (3,10), (4,10), (5,10), (6,10), (7,10), (8,10), (9,10), (6,11), (7,11), (8,11), (9,11), (10,11), (6,12), (7,12), (8,12), (9,12), (10,12), (11,12), (6,13), (7,13), (8,13), (9,13), (10,13), (11,13), (12,13), (6,14), (7,14), (8,14), (9,14), (10,14), (11,14), (12,14))

- c. Was a. or b. easier to calculate?

- Compress the line using the chain code and calculate the length using the compressed line.



- Compress the polygon using the blockcode and calculate the centroid using the compressed polygon.



### Exercise 2 (Shortest Path Problem)

The graph given below show ICE-connections between some german cities. The weight of each edge is the time needed to cover that distance.

- Calculate the path with the shortest driving time from Braunschweig to every other city using one of the three algorithms presented on slides 200 to 204.
- Why did you choose that algorithm?

