

## T-61.5070 COMPUTER VISION, Exercise 5/08

### Motivation

The purpose of this exercise is to be acquainted with morphological filtering.

1. Prove the following properties of dilation. See textbook, page 564/662.

- (a)  $X \oplus B = B \oplus X$
- (b)  $X \oplus (B \oplus D) = (X \oplus B) \oplus D$
- (c)  $X \oplus B = \bigcup_{b \in B} X_b$
- (d)  $X_h \oplus B = (X \oplus B)_h$

2. Skeletonize the objects in the given images by using the algorithm 6.8/8.8 (p. 267/365) and skeletonizing by maximal balls as in section 11.5.2/13.5.2.

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	1	0	0	0	0
0	0	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	0	0
0	0	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1	1	0
0	0	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

3. Construct the quench functions for the four skeletons created in the previous exercise and try to reconstruct the original images using them. What is the appropriate type of ball in each case? Also create the ultimate erosions using the quench function.