

ECE 6364 Spring 2016 HW 11 Due 5/2

Problem 1.

a) Compute (A erosion B)

b) Compute (A dilation B)

$$\underline{\mathbf{A}} = \begin{bmatrix} 0 & [1] & 0 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & 0 & 0 & 0 \end{bmatrix} \text{ and } \underline{\mathbf{B}} = \begin{bmatrix} 0 & 0 & 0 \\ 0 & [1] & 1 \\ 0 & 1 & 1 \end{bmatrix}$$

Problem 2.

a) Compute (A open B)

b) Compute (A close B)

$$\underline{\mathbf{A}} = \begin{bmatrix} 0 & [1] & 0 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & 0 & 0 & 0 \end{bmatrix} \text{ and } \underline{\mathbf{B}} = \begin{bmatrix} 1 & 1 & 1 \\ 1 & [1] & 1 \\ 1 & 1 & 1 \end{bmatrix}$$

Problem 3.

Compute (A hit-miss B) $\underline{\mathbf{A}} = \begin{bmatrix} 0 & [0] & 0 & 0 & 1 & 1 \\ 1 & 0 & 1 & 0 & 0 & 1 \\ 0 & 1 & 1 & 1 & 1 & 0 \\ 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 1 & 1 & 1 & 0 \\ 1 & 1 & 1 & 1 & 1 & 1 \end{bmatrix}$ and $\underline{\mathbf{B}} = \begin{bmatrix} 0 & 0 & 0 \\ [1] & & \\ 1 & 1 & 1 \end{bmatrix}$

Problem 4.

$$\underline{\mathbf{A}} = \begin{bmatrix} 0 & [1] & 0 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & 0 & 0 & 0 \end{bmatrix} \text{ and } \underline{\mathbf{B}} = \begin{bmatrix} 0 & 0 & 0 \\ x & [1] & x \\ 1 & 1 & 1 \end{bmatrix}$$

Compute (A $\circ$ B) i.e. A thinned by B

$$\text{where } \underline{\mathbf{B}}^1 = \begin{bmatrix} 0 & 0 & 0 \\ x & [1] & x \\ 1 & 1 & 1 \end{bmatrix} \quad \underline{\mathbf{B}}^2 = \begin{bmatrix} 1 & x & 0 \\ 1 & [1] & 0 \\ 1 & x & 0 \end{bmatrix} \quad \underline{\mathbf{B}}^3 = \begin{bmatrix} 1 & 1 & 1 \\ x & [1] & x \\ 0 & 0 & 0 \end{bmatrix} \quad \underline{\mathbf{B}}^4 = \begin{bmatrix} 0 & x & 1 \\ 0 & [1] & 1 \\ 0 & x & 1 \end{bmatrix}$$

i.e. compute (A $\circ$ {B}) = ((((A $\circ$ B¹) $\circ$ B²) $\circ$ B³) $\circ$ B⁴)