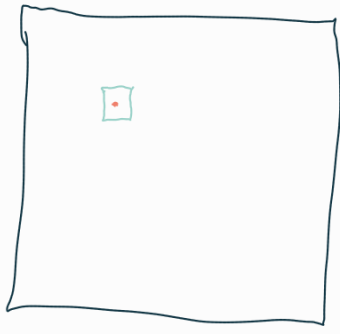


black binarization localized thresholding
select the threshold for pixel based on
a localized window.



[cleaning the image]

Morphological operations: dilation, erosion
več bele & več črne &

structuring element (SE) je tot kernel.
(maska)

- fit: vse črte v SE so črte v lugi
 - hit: vsaj ena črta v SE je črna v lugi
- to SE postavljamo v tiam na sliko

erosion:
$$g = f \ominus S$$

$\begin{matrix} \text{eros (img)} & \text{img} & \text{erosion} & \text{SE} \\ \uparrow & \uparrow & \uparrow & \uparrow \end{matrix}$

$$g(x,y) = \begin{cases} 1; & \text{s fits f on } (x,y) \\ 0; & \text{since} \end{cases}$$

primer za $S = \begin{bmatrix} 0 & 1 & 0 \\ 1 & 1 & 1 \\ 0 & 1 & 0 \end{bmatrix}$,

dilation:
$$g = f \oplus S$$

$\begin{matrix} \text{dilat (img)} & \text{img} & \text{dilation} & \text{SE} \\ \uparrow & \uparrow & \uparrow & \uparrow \end{matrix}$

$$g(x,y) = \begin{cases} 1; & \text{s hits f on } (x,y) \\ 0; & \text{since} \end{cases}$$

primer za $S = \begin{bmatrix} 0 & 1 & 0 \\ 1 & 1 & 1 \\ 0 & 1 & 0 \end{bmatrix}$

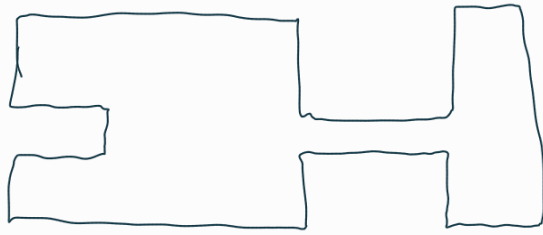
ne prepisujemo
slike proti,
pikso v novo.

[combined operations]

● apply erosion then dilation ("opening")

$$A \circ B = (A \ominus B) \oplus B$$

A:



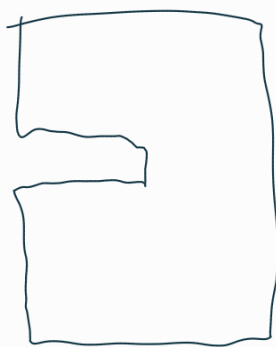
↓ eros



thinned



↓ dilat

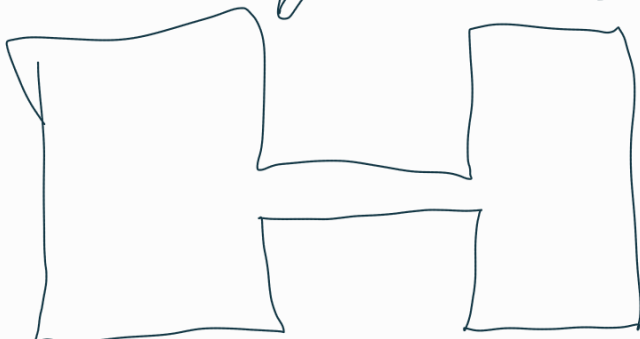
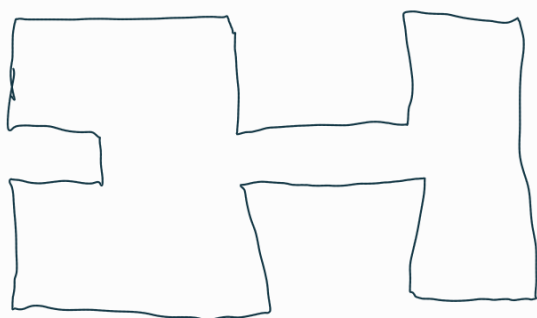


back to size with bridge removed.

opening by a small SE will remove small high frequency elements on img,
opening by a large SE will remove also larger lower frequency elements on img.

● apply dilation then erosion.

closes openings/holes in white objects:



$$A \bullet B = (A \oplus B) \ominus B$$

example: opening [closing (img)]

[img PROCESSING II]

- linear filters : denoising and edge detection

how to remove gaussian noise? blur.