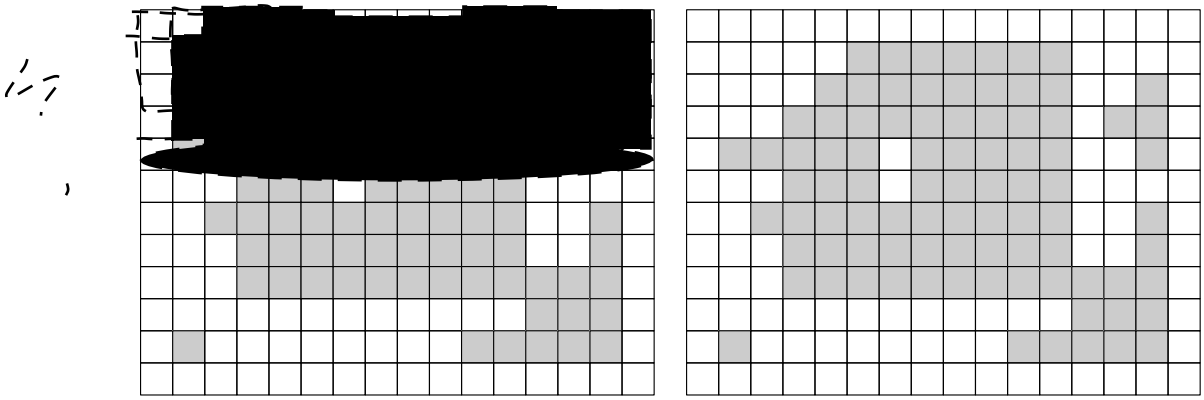
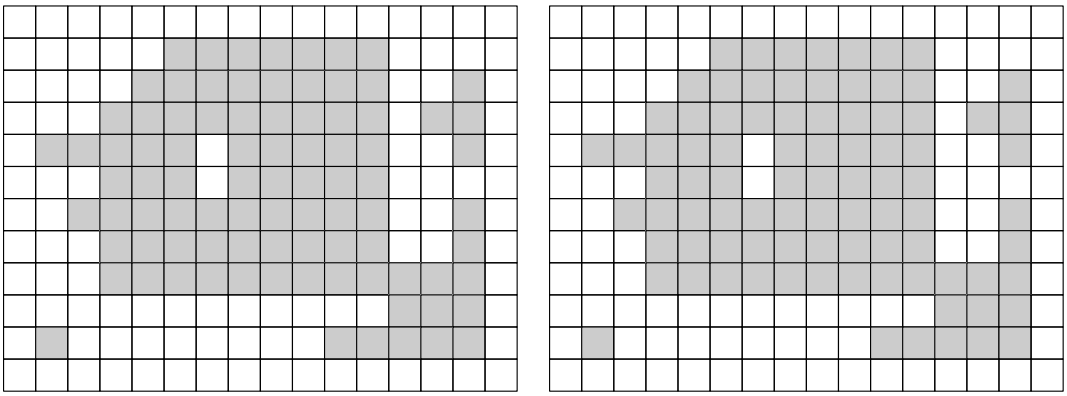
1 Pre-Recorded Tasks

1.1 Morphological Filters

1. Do an erosion, dilation, opening and closing with a 3×3 mask in the following drawings!

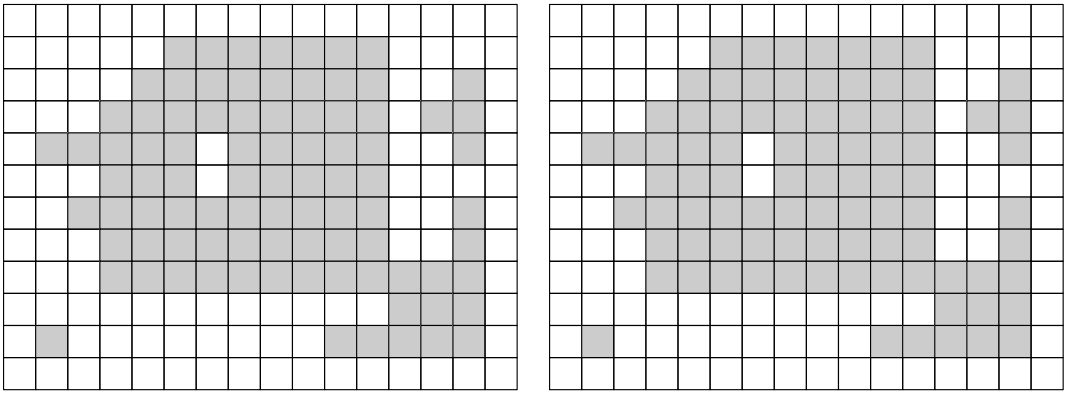


Erosion Dilation



Opening Closing

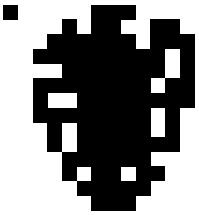
2. In the next step, the original image shall be XORed with the eroded and the dilated image.



Original XOR Erosion Original XOR Dilation

1.2 Morphological Filtering

A binary input image x_1 has been modified with morphological operations using the structure element s. Below you can see the 4 different results A, B, C and D. Assign the operations Erosion, Dilation, Opening and Closing to the resulting images A to D and give reasons for your choice!



Input Image x_1

Structure Element s

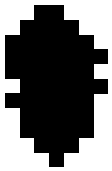


Image A

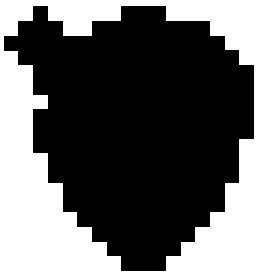


Image B

Image C

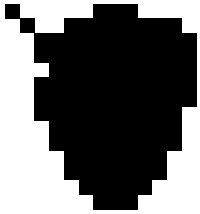


Image D

2 Self-Study Matlab Tasks

2.1 Morphological Filtering using MATLAB

Load the provided `morph_object_matlab.png` and perform the filtering operations from problem 1.1 using MATLAB. Show the outcome of your operations and compare it to your results from before.
Hint: The `imerode` and `imdilate` function might be useful.

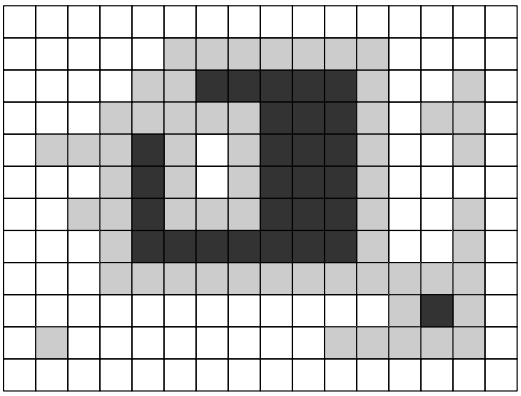
2.2 Image Averaging

Load the provided image `shed_1.png` into your MATLAB workspace. Use the `imnoise` function to generate five images containing gaussian noise. Perform an averaging of the images as explained in the script (1-40 & 1-41) in order to reduce the noise. Compare the averaged image to the noisy ones.

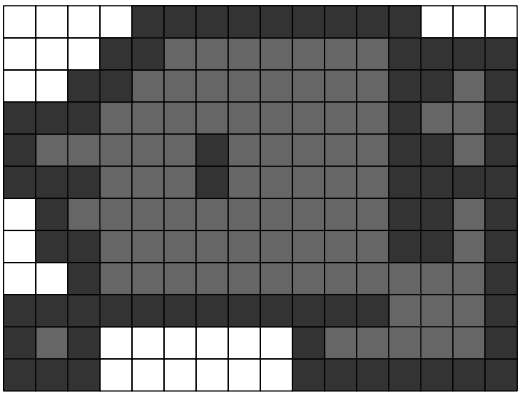
1 Pre-Recorded Tasks

1.1 Morphological Filters

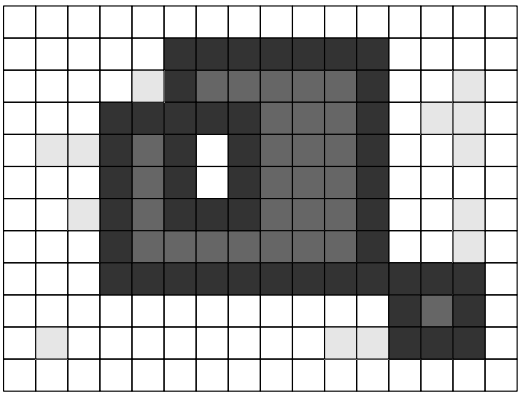
1. Do an erosion, dilation, opening and closing with a 3×3 mask in the following drawings!



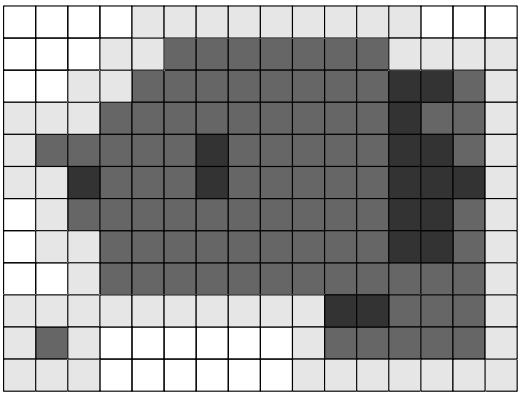
Erosion



Dilation

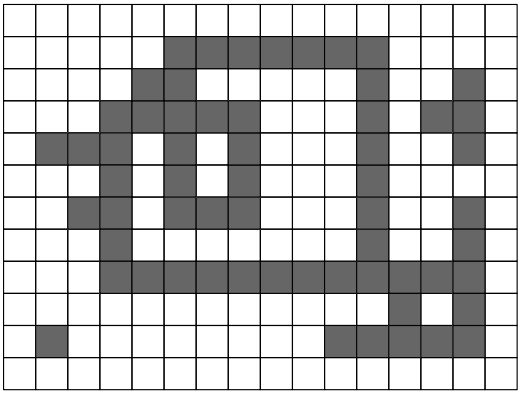


Opening

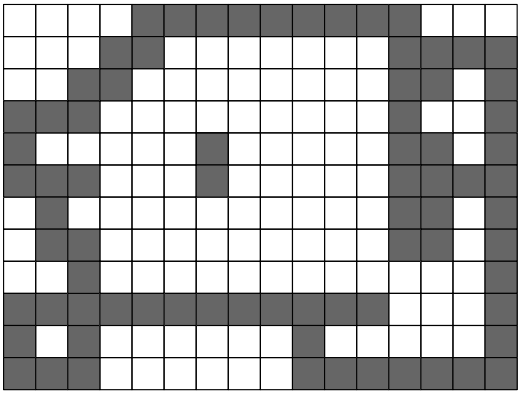


Closing

2. In the next step, the original image shall be XORed with the eroded and the dilated image.



Original XOR Erosion



Original XOR Dilation

1.2 Morphological Filtering

A binary input image x_1 has been modified with morphological operations using the structure element s. Below you can see the 4 different results A, B, C and D. Assign the operations Erosion, Dilation, Opening and Closing to the resulting images A to D and give reasons for your choice!

- Image A - Opening: Small objects removed
- Image B - Dilation: Largest shape
- Image C - Erosion: Smallest shape
- Image D - Closing: Small holes filled

2 Self-Study Matlab Tasks

2.1 Morphological Filtering using MATLAB

Load the provided `morph_object_matlab.png` and perform the filtering operations from problem 1.1 using MATLAB. Show the outcome of your operations and compare it to your results from before.
Hint: The `imerode` and `imdilate` function might be useful.

2.2 Image Averaging

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