Homework 03: Due Monday, April 8 at 11:59 pm

1. Dilate image A by using structuring element B.

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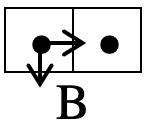
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| B | |  |

A

1. Erode image A by using structuring element B.

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A



1. An automated system for machine learning is built to assess parts being manufactured. The system has a camera that takes image of a test pattern, and the image is binarized for further processing. Unfortunately, the camera in malfunctioning and introducing line artifacts in the images. The figure below shows the test pattern and the corrupted image with the line artifacts that is being captured. In order to diagnose the problem and fix the camera, a count of the artifact lines is needed. Since there are a large number of images, the counting cannot be done manually. Use morphological image operations and develop an algorithm that will automatically count the line artifacts in the image. The line artifacts are known be inclined at 45° and vary in length from 35-50 pixels and are about 2-4 pixels wide.

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| Original Image | Captured image with line artifacts |
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1. You have been provided with an image of a woven fabric with tears that are larger and darker compared to the texture of the fabric. You task is to identify the tears that are there in the fabric. Since the fabric pattern has dark areas too, simple thresholding cannot be directly used to find the tears in the fabric. However, since the size of dark areas of the natural pattern of the fabric is smaller than that of the tears, morphological operations can be used to preprocess the image and improve the ability to detect the tears. Hint: Use graylevel morphological operations such as open or close or combined open-close or close-open operations. Your structuring element should match the shape and size of the feature you are trying to detect. Justify your choice of operations used, and report on the number and the area and location of the tears in the fabric.

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