Fundamental Biomedical Image Processing
Assignment 3
Post Date: Nov. 3, 2025; Due Date: Nov. 17, 2025

NOTE:

- Your assignments / project can be in Matlab, Python, C++.

- You can get extra bonus without using libraries.

- Deadline. The solutions to the assignments / project should be submitted by 12 pm on the date they are due. The late assignments will not be accepted.

Theoretical questions

1. A binary image contains straight lines oriented horizontally, vertically, at 45°, and at -45°. Give a set of 3 x 3 masks that can be used to detect 1-pixel breaks in these lines. Assume that the intensities of the lines and background are 1 and 0, respectively.

Programming exercises

1. Problem 1. Remove the smaller disks from Fig. 1 with minimal change to the large disks.

2. Problem 2. Edge detection.
   (a) Write a computer program to threshold Fig. 2 and make it into a binary image.
   (b) Use binary operations to detect the edges of the picture of the square given in Fig. 2.
   (c) Use Hough transform to detect the picture of the circle given in Fig. 2.