Exercise 5: Binary vision

In this exercise, you will find the image gradients, apply canny and find circles using Hough circle detection.

- Load an image and compute the gradient magnitude and gradient direction for each pixel in the image using your convolution method from exercise 2 with a Sobel kernel instead of an averaging kernel. You might want to use OpenCV method cartToPolar to convert between cartesian and polar coordinates (x,y -> magnitude, angle). To visualize gradients which are best expressed as CV_32F images you will need to convert your images to 255 uchar. Use fx. OpenCVs convertScaleAbs. (If your solution of exercise 2 does not allow the flexibility to use a custom kernel use OpenCVs Sobel method instead.).
- Use canny to detect lines in the image. Choose appropriate threshold for the hysteresis-thresholding. Try to change the thresholds and observe the change in the computed canny edges.
- Optional: Implement Canny yourself: Smoothing, gradient computation, non-maxima supression, hysteresis-thresholding
- Use OpenCVs Hough circle method to detect circles in an image. You will get the chance to implement this method yourself in a later exercise.