# Homework #2

- Out:      Monday February 4

- Due:      Monday February 18

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# Part 1: Basic Mathematical Morphology

- **(A)** In this problem you are asked to solve a task similar to the one of the results given in the "Mathematical Morphology" paper by Haralick and Shapiro (i.e. Chapter 5 in "Computer and Robot Vision",Addison-Wesley, 1993). Using the morphological operators provided by matlab write a short program that separates out the disk, the square, and the rectangle from the image shown below. Post your matlab code, your original image and your three resulting images on the wiki page. The original grayscale image will be provided along with the submission template.
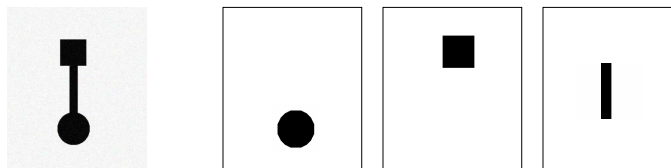


Figure:   **Left:** Original image        **Right:** Resulting images

- **(B)** Now do the same but this time use openCV to perform the segmentation. Post your C code, your original image, and your three resulting images on the wiki page.

# Part 2: Security Code Reader

- A) Write a program that finds the occurrence of the number '5' in security code images similar to the ones shown below:



- B) Modify your program to find the occurrences of all numbers 0-9 in an image. Letters can be skipped.

- Your code will be evaluated with images of the same type (i.e., different security codes with the same font).

# What to Submit (for part 2)

- Post your original images, your result images, and your code on the Wiki.

- You can use either matlab or OpenCV for part 2.

- Your grade will not depend on the method and/or platform that you choose.

# Part 3: Detecting Stop Signs



- Your task is to detect one or more STOP signs in sample images by locating the letters 'S','T','O','P'.

- The size of the stop sign(s) (i.e., letters) will vary.

# What to Submit (for part 3)

- Your program must detect and surround the STOP sign(s) with a red box.

- Your program must also detect and output the letters 'S','T','O','P' superimposed on the original image at the correct place.

- Your program must be scale invariant, i.e., it must be able to detect letters at any size.

- Sample STOP sign images are posted on the course website.

## What to Submit (for part 3)

- Post your original stop signs, your result images, and your code on the Wiki.

- You can use either matlab or OpenCV for part 3.

- Your grade will not depend on the method and/or platform that you choose.

# That's it.

# Good Luck!