Compile a PDF file with your results from the problems below and email to [sara@ucsc.edu](mailto:sara@ucsc.edu). Please include explanations of what you are doing and what is happening to the images.

Homework due date for each problem set is announced on the class website. You will have at least two weeks to finish each homework set, so that you can work out and resolve any problems and difficulties with instructor support.

Operations:

Erosion: using a convolution kernel that erodes structures in the image

Dilation: using a convolution kernel that dilates structures in the image

Opening: Erosion followed by dilation

Closing: Dilation followed by erosion

**Mathematical morphology with binary images.** Use the clock face image clock.png – download from the course website – to explore the following operations. Please use **both** MATLAB and ImageJ/FIJI so that you understand what the operations does. First: binarize the image with a method that is suitable. Then test out the following operations:

* 1. Erode
  2. Dilate
  3. Open
  4. Close